

THE ORTHOTYLINAE AND PHYLINAE (HEMIPTERA: MIRIDAE) OF SOUTH AFRICA WITH A PHYLOGENETIC ANALYSIS OF THE ANT-MIMETIC TRIBES OF THE TWO SUBFAMILIES FOR THE WORLD¹

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PART 2. A PHYLOGENETIC ANALYSIS OF THE ANT-MIMETIC TRIBES
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ABSTRACT: This study is divided into two parts: 1) a faunal study of the Orthotylynae and Phylinae of South Africa; and 2) a phylogenetic analysis of the tribal classification of the two subfamilies for the world. Much new information on the relationships of these taxa is derived from the South African fauna.

In South Africa the Orthotylynae and Phylinae are represented by 54 genera, 20 of which are described as new, and 103 species, 81 of which are described as new. Of the genera occurring in South Africa, 15 percent of the Orthotylynae and 34 percent of the Phylinae are ant mimetic. Generic keys are presented for the Orthotylynae and Phylinae of Africa south of the Sahara; keys to the species are given for those genera occurring in South Africa.

A zoogeographic analysis reveals that the fauna of South Africa is composed of endemic, tropical African, Paleotropical, pantropical, and cosmopolitan elements. The endemic element is the largest and is concentrated in the Southwest Cape and along the Drakensberg Escarpment.

Three tribes are recognized in the Orthotylynae—the Halticini, the Nichomachini, new tribe, and the Orthotylini. The Pilophorini, which have been placed in the Orthotylynae by all previous authors, are moved to the Phylinae, in which four tribes are recognized—the Hallodapini, the Leucophoropterini, new tribe, the Phylini, and the Pilophorini. The classification of the Miridae is discussed briefly. A morphological description and discussion of the phylogenetic and zoogeographic relationships are presented for each tribe. A discussion of each included genus is given for the primarily ant mimetic tribes Nichomachini, Hallodapini, Leucophoropterini, and Pilophorini. In the remaining tribes only those genera which must be moved relative to their placement in the Carvalho System of Classification are discussed in detail.

INTRODUCTION

This study had its origin in 1967–1968 when I had the opportunity to spend nearly a year in the field in South Africa collecting and observing the Miridae of the area. It soon became evident that the South African fauna was not only large and varied, but very poorly known, and that it contained a number of elements, knowledge of which was fundamental to a more mature understanding of the phylogeny and zoogeography of the Miridae as a whole.

My decision to approach the work in the format presented here has been based on the following premises: 1) that the current bases for placing genera in the Phylinae and Orthotylinae were unsatisfactory; and 2) that the many ant-mimetic genera in the two subfamilies appeared to have been placed in the taxonomic hierarchy on the basis of shared mimetic characters of a superficial nature rather than on features of a more fundamental phylogenetic significance. Therefore, this paper is divided into two sections: a faunal and biological study of the Orthotylinae and Phylinae of South Africa with an analysis of the taxonomic relationships and distributions of the genera and species of the region; and an analysis of the phylogeny, taxonomy, and zoogeography of the ant-mimetic tribes and genera of the two subfamilies, not only for South Africa, but for the entire world.

The Orthotylinae and Phylinae are especially intriguing phylogenetically because 1) a relationship between the two subfamilies has been observed by most students of the Miridae (Reuter, 1905a; Slater, 1950; Wagner, 1955; Kelton, 1959b; Leston, 1961), but has never been carefully documented; 2) the subfamily Orthotylinae has for some time been known to contain a number of possibly unrelated elements (Slater, 1950; Kelton, 1959b), but these have never been comprehensively reviewed; and 3) large numbers of ant-mimetic genera occur in both subfamilies but the phylogenetic relationships among these genera and their relationships to non-mimetic genera are very poorly understood.

In South Africa two genera (15 percent) in the Orthotylinae and 14 genera (34 percent) in the Phylinae are ant mimetic. On a world basis approximately 20 (17 percent) of the orthotyline genera and 53 (24 percent) of the phylinae genera are ant mimetic. This high proportion of mimetic genera in South Africa, particularly in the Phylinae, identifies the area as one of active ant-mimic evolution and one suitable for studies involving the phenomenon. In addition, the extremely diverse nature of the South African flora,

in light of the strong host plant specificity of the Miridae, enhances the area's attractiveness as one in which to develop a greater systematic knowledge of the Orthotylinae and Phylinae and to begin phylogenetic studies.

METHODS AND MATERIALS

Throughout this study I have employed standard taxonomic procedures. All measurements were taken with an ocular micrometer and are in millimeters. The line drawings were made with the aid of a squared grid at $150\times$ using a Leitz binocular dissecting microscope and all are reproduced to the same scale. The phallus is illustrated in a lateral view with the phallobase to the left, unless otherwise indicated. Consistency of orientation was attained by viewing the phallobase laterally and superimposing the two sides of the bilaterally symmetrical structure. In almost all cases this presents the most useful view of the vesica for comparative purposes. In a few cases other views of the vesica are given where the conventional orientation does not show the most useful structural details. The left clasper and phallothea in the Phylinae are all illustrated in a lateral perspective. The right clasper is always drawn in such a view as to expose the greatest surface area. Consistency of orientation is more difficult with the claspers of the Orthotylinae but the view is usually obvious or explained in the figure captions. The posterior wall and sclerotized rings of the females are drawn showing their orientation relative to the ovipositor valves. Where genitalic structures are similar for all species of a given genus the structures under consideration are illustrated for only one or a limited number of species. All photographic illustrations were made with a Wild M-4 photomicrographic apparatus at $12.5\times$ on Kodak Panatomic-X 35 mm. film and reproduced to the same scale.

I have relied heavily on the Carvalho Catalogue of the Miridae of the World (Carvalho 1952a; 1958a, b; 1960). This invaluable work brings together taxonomic references on the Miridae up to 1955.

A list of taxa treated in the South African faunal study is given below. These names are often cited in abbreviated form elsewhere in the text to conserve space. For each of these taxa I have included a complete citation for the original description. For genera treated in detail in the tribal analysis, a complete citation is included only for those not included in the Carvalho Catalogue. No references

are given between the date of original description (if before 1955) and 1955 unless they pertain to new synonymy or were omitted from the Carvalho Catalogue. All South African locality data are listed in a somewhat abbreviated form, except in the case of new species where the holotype data are transcribed from the specimen labels as accurately as possible, with the exception of abbreviated words. Collectors are listed by surname in parentheses at the end of the locality data. If no collectors are listed and the dates are 1967–1968 the specimens were collected by J. A. Slater, M. H. Sweet, S. T. Slater, R. T. Schuh, and in some cases J. Munting. Abbreviations of collections where specimens are deposited are listed in parentheses at the end of the locality data.

All keys are strictly utilitarian and I have made no attempt to show phylogenetic relationships in them. Where possible, if a couplet breaks out a higher category, this is indicated. In many cases genera are keyed out more than once. I have tried to avoid the use of sexual characters or those that require dissections, but in some cases this has not been possible.

The graphs used to depict distributional patterns follow Wygodzinsky (1966). As in Wygodzinsky's work, the hatched boxes represent endemic genera and the numbered boxes indicate more widespread genera and show the number of faunal regions in which a genus occurs. Papua is included in the Oriental Region, because the very limited number of taxa known from that area appear to have their strongest affinities with the mainland Oriental fauna. The Ethiopian Region includes Africa south of the Sahara and Madagascar.

At the end of each tribal analysis is included a section entitled "Discussion of individual genera". For the Orthotylini, Halticini, and Phylini I have included only ant-mimetic genera or genera that must be moved from their position in the Carvalho classification; the latter are marked with an asterisk. A complete generic listing is given for the primarily ant-mimetic tribes Nichomachini, Halodapini, Leucophoropterini, and Pilophorini. A terminal listing of genera *incertae sedis* and "misplaced genera" is also included for the Orthotylinae and Phylinae as defined in the Carvalho Catalogue.

The geographic area included in the South African faunal study encompasses the Republic of South Africa, Swaziland, Lesotho, and South West Africa. Some taxa from outside this area are discussed where they are either closely related to genera or species from South Africa or where it is probable that they may eventually be found there. They are placed at the end of the appropriate genus or tribe.

Data for this research were gathered from several sources. A large number of specimens were collected by J. A. Slater, M. H. Sweet, and myself from October 1967 to May 1968. During this time we worked intensively in most areas of South Africa except the arid western regions and South West Africa. The major additional sources of information for South Africa were the South African National Collection of Insects, Pretoria, the South African Museum, Cape Town, the Transvaal Museum, Pretoria, the Lund University Zoological Institute, Lund, Sweden, and the British Museum (Natural History), London.

Many Reuter and Poppius types important to this study are in the Helsinki Museum and I have relied heavily on this extremely valuable collection. Poppius (1914a; 1921) indicated that some of his type specimens were deposited in collections other than Helsinki. Most important were the Paris Museum and the Berlin-Humboldt Museum. I have determined, with the generous assistance of all curators concerned, that in fact most of the specimens which Poppius studied were never placed in the museums indicated. This was apparently a result of the outbreak of World War I. The specimens in question are all deposited in Helsinki and for the most part are in excellent condition. Where appropriate I have corrected Poppius' original statements and given the present location of the types. In many cases where original series of two, three, or four specimens were indicated, now only a single specimen can be found. The whereabouts of the remaining specimens are unknown, for I could not locate them after much searching. In all cases where I have been able to find only a single specimen of what was originally a co-type series of two or more specimens, I have designated the specimen as a lectotype.

Institutional and private collections from which I have borrowed material are listed below with the abbreviations used in the locality records in the text.

AMNH	American Museum of Natural History, New York
BM (NH)	British Museum (Natural History), London
CAS	California Academy of Sciences, San Francisco, California
HM	Helsinki Zoological Museum, Helsinki, Finland
JAS	J. A. Slater Collection, University of Connecticut, Storrs, Connecticut

LU	Lund University Zoological Institute, Lund University, Lund, Sweden
PM	Museum National D'Histoire Naturelle, Paris, France
RTS	R. T. Schuh Collection
SAM	South African Museum, Cape Town, South Africa
SANC	South African National Collection of Insects, Pretoria, South Africa
TM	Transvaal Museum, Pretoria, South Africa
USNM	United States National Museum, Washington, D. C.

TERMINOLOGY

Cobben (1968) discussed pretarsal nomenclature in the Hemiptera and concluded on morphological grounds that the structures arising between the tarsal claws in the Miridae are not true arolia and proposed the use of the term *parempodia*. For pseudarolia Cobben used the term *pulvilli*. Goel and Schaefer (1970) came to the same conclusions as Cobben, apparently independently, for they did not cite him.

Although there is justification for the argument that use of the terms *parempodia* and *pulvilli* in the Miridae is unnecessary substitution for the long-standing terms *arolia* and *pseudarolia* (Knight, 1918), the arguments for the change seem stronger. Cobben (1968) noted that true arolia do exist in the Hemiptera, notably in the Amphibicorisae. If the term *arolia* is used in non-Amphibicorisan families, a new term will have to be coined for the true arolia. The term *pseudarolia* is used only in the Miridae to apply to apparently homologous structures called *pulvilli* in most groups. Little confusion should arise in the Miridae because the change involves only a simple substitution of terms and not a reevaluation of the morphology of the structures (see also discussion under *Paramixia*, below).

I have adopted the terminology of Kelton (1959b) for the male genitalia and that of Slater (1950) and Davis (1955) for the female genitalia. Other terminology is more or less standard in the modern hemipterological literature.

NOMENCLATURE

Although the Carvalho Catalogue of the Genera of Miridae of the World (Carvalho, 1952a) was issued long before the most recent International Code of Zoological Nomenclature (1964), the

subfamily and tribal names applied by Carvalho in the Orthotylinae and Phylinae are correct. Many of these names were changed before 1961 to agree with the oldest included genus. All have received general acceptance subsequently and therefore are valid under Article 40A of the Code.

I am considering publication of names in the Carvalho Catalogue (1958a, b) to represent introduction into the primary zoological literature. If this was not done many of the names published by Poppius (1914a) would have to be considered as forgotten under Article 23b of the Code or they would have to be referred to the International Commission. Most previously described taxa in this paper illustrate the general inapplicability of Article 23b, particularly in entomology, and I have therefore not strictly followed the Code on this point.

PART 1. THE ORTHOTYLINAE AND PHYLINAE OF SOUTH AFRICA

HISTORICAL REVIEW

The only monographic treatment of the Miridae of the Ethiopian Region is Poppius' "Die Miriden der Äthiopischen Region" (1912; 1914a). In this work Poppius detailed the knowledge of the Miridae of Africa, Madagascar, and the adjacent islands of the Atlantic and Indian Oceans. Previous to this only a handful of small papers had treated the African Miridae.

Poppius (1914a) recorded 41 genera, 19 of which were described as new, for the Orthotylinae and Phylinae south of the Sahara. From 1914 to 1955 only five new genera and 13 new species of Orthotylinae and Phylinae were described from Africa, and very little additional information was added to the literature regarding previously recorded species. With the inception of the work of T. R. Odhiambo in 1958, the status of the African Miridae began to change rapidly. From 1955 to 1971, nine new genera and 50 new species of Orthotylinae and Phylinae were described from Africa south of the Sahara. The total number of genera in these two subfamilies now recorded from Ethiopian Africa, including those described below, stands at 68.

The publication of the South African Animal Life Series beginning in 1955 has greatly increased our knowledge of many groups of animals in South Africa, and it is certainly the most significant contribution to South Africa entomology in recent years. Unfortunately the mirid chapter (Carvalho, et al., 1960) was based solely on the original Brinck and Rudebeck collections and is therefore

incomplete. The neglected nature of the South African fauna is revealed in the fact that previous to 1960 and the publication of the Miridae section of the South African Animal Life Series, only nine genera and nine species of Orthotylinae and Phylinae were recorded from the region. Carvalho, et al. (1960) recorded 11 genera, none of which were described as new, and 12 species, one of which was described as new.

In the following treatment, of the 54 genera I record from South Africa, 20 (37%) are described as new and only 17 were previously recorded from the area. Of the 103 species, 81 (79%) are described as new and 14 were previously recorded from the region (species of *Orthotylus*, *Psallus*, and *Campylomma-Sthenarus* are not included in these figures). In addition, there are several apparently undescribed genera available in collections, but in all cases the material is either inadequate or its relationships too obscure to allow for description at the present time.

CHECKLIST OF GENERA AND SPECIES

Subfamily Orthotylinae

Tribe Halticini

- Namaquacapsus*, new genus
- melanostethoides*, new species
- Nanniella* Reuter
- Halticus* Hahn

Nichomachini, new tribe

- Nichomachus* Distant
- minutus*, new species
- rufescens*, new species
- sloggetti* Distant
- sweeti*, new species
- Pseudonichomachus*, new genus
- capeneri*, new species
- mimeticus*, new species

Tribe Orthotylini

- Cyrtorhinus* Fieber
- melanops* Reuter
- Felisacodes* Bergroth
- bryocorina* (Poppius)
- Orthotylus*-complex
- Pseudambonea*, new genus
- capeneri*, new species
- Pseudoloxops* Kirkaldy
- transvaalensis*, new species

Pseudopilophorus, new genus

capeneri, new species

Zanchiella, new genus

bowkeriae, new species

capensis, new species

ericae, new species

natalensis, new species

sweeti, new species

Zanchius Distant

alba, new species

buddleiae, new species

leucosideae, new species

nigrolineatus, new species

Subfamily Phylinae

Tribe Hallodapini

Acrorrhinium Noualhier

brincki Carvalho and Becker

capensis, new species

drakensbergensis, new species

formicarium (Poppius)

incrassata, new species

monticola, new species

muntingi, new species

oudtshoornensis, new species

Azizus Distant

oculatus (Poppius)

Carinogulus, new genus

hobohmi, new species

kochi, new species

transvaalensis, new species

varii, new species

Formicopsella Poppius

regneri Poppius

Hallodapus Fieber

albofasciatus (Motschulsky)

pseudosimilis, new species

quadrimaculatus, new species

similis (Poppius)

transvaalensis, new species

dispar (Odhiambo), new combination, extralimital

poseidon (Kirkaldy), extralimital

vittatus (Odhiambo), new combination, extralimital

Laemocoris Reuter

Myombea China and Carvalho

bathycephala China and Carvalho

- Pangania* Poppius
 fasciatipennis Poppius
 chnous (Odhiambo), new combination, extralimital
Skukuza, new genus
 slateri, new species
 zeugma (Odhiambo), new combination, extralimital
Systellonotopsis Poppius
 bifasciatus Poppius
Systellonotus Fieber
 brincki, new species
Trichophorella Reuter
 australis, new species
Trichophthalmocapsus Poppius
 australis, new species
 hessei, new species
 pilosus Poppius, extralimital
 pumilis (Odhiambo), new combination, extralimital
Aeolocoris Reuter, extralimital
 alboconspersus Reuter
Boopidella Reuter, extralimital
 fasciata Reuter
Diocoris Kirkaldy, extralimital
 agalestus Kirkaldy
Leucophoropterini, new tribe
 Karoocapsus, new genus
 bifasciatus, new species
 brunneus, new species
 flavomaculatus, new species
 middelburgensis, new species
 obscurus, new species
 occidentalis, new species
 pulchrus, new species
 trifasciatus, new species
 Tytthus Fieber
 parviceps (Reuter)
Tribe Phylini
 Austropsallus, new genus
 albonotum, new species
 drakensbergensis, new species
 helichrysi, new species
 middelburgensis, new species
 saniensis, new species
 senecionus, new species
 Brachycranella Reuter
 viridipunctata (Stål)

- Capecapsus*, new genus
 - tradouwensis*, new species
- Coatonocapsus*, new genus
 - johannsmeieri*, new species
 - pallidus*, new species
 - sweeti*, new species
 - transvaalensis*, new species
- Denticulophallus*, new genus
 - adenandrae*, new species
- Ellenia* Reuter
 - obscuricornis* (Poppius)
- Eminoculus*, new genus
 - drosanthemi*, new species
 - hirsutus*, new species
- Lamprosthenarus* Poppius
 - near *sjostedti* Poppius
- Lasiolabopella*, new genus
 - capeneri*, new species
- Lepidocapsus* Poppius
 - rubrum*, new species
- Leptoxanthus* Reuter
 - flavomaculatus* Reuter
- Macrotylus* Fieber
 - hemizygiae*, new species
 - niger*, new species
- Natalophylus*, new genus
 - heteromorphae*, new species
- Odhiamboella*, new genus
 - solani* (Odhiambo), new combination
- Parapseudosthenarus*, new genus
 - buchenroederiae*, new species
- Parasciodema* Poppius
 - albocoxa*, new species
 - nigrofemur*, new species
 - nitens*, Poppius
- Plagiognathidea* Poppius
 - Psallus* Fieber
- Pseudosthenarus* Poppius
 - ater* Poppius
 - grossus*, new species
 - namaquaensis*, new species
 - rozeni*, new species
- Sthenarus-Campylomma*
 - nigricornis* (Poppius) (*Sthenarus*), extralimital
- Stoebea*, new genus
 - barbertonensis*, new species

- elginensis*, new species
plettenbergensis, new species
Widdringtoniola, new genus
kirstenboschiana, new species
 Tribe Pilophorini
Aloea Linnavuori, (in press)
 australis, new species
 samueli, new species
Ambonea Odhiambo
 munroi, new species
 rustenbergensis, new species
Neoambonea, new genus
 cynanchi, new species
 slateri, new species
Parambonea, new genus
 transvaalensis, new species
Paramixia Reuter
 australis, new species
 suturalis Reuter
Pilophorus Hahn
 pilosus Odhiambo

KEY TO THE SUBFAMILIES OF MIRIDAE¹

1. Ocelli present Isometopinae
 Ocelli absent 2
2. Parempodia fleshy, convergent or divergent apically 3
 Parempodia hair like, parallel 4
3. Parempodia distinctly divergent apically; pronotal collar usually present, generally rounded and separated from the remainder of the pronotum by a furrow (see however *Stenodemini*) Mirinae
 Parempodia convergent apically, usually recurved (lyre shaped); pronotal collar seldom present
 Orthotylinae and Phylinae (in part)
4. Pulvilli present, sometimes large, but often small and difficult to see, either free except at base or less commonly adnate to claw over entire length 5
 Pulvilli absent; claws long and slender or strongly toothed basally; if claws strongly toothed, pronotal collar always present and rounded; if claws long and slender, pronotal collar either present or absent 7
5. Pulvilli arising from ventral surface of claws, usually small; tarsi linear; membrane with two cells Phylinae (in part)
 Pulvilli arising from inner surface of claws, usually enlarged, flat-

¹ Modified from Carvalho (1955a). The Palauocorinae are not included. For figures of parempodia types see Carvalho (1955a), Knight (1923; 1941; 1968) and Wagner (1961).

- tened, adnate to claw only at base; tarsi and membrane variable 6
6. Membrane with one cell; tarsi thickened distally Bryocorinae
 Membrane with two cells; tarsi linear Dicyphinae
7. Claws strongly toothed basally; dorsum usually heavily punctate Deraeocorinae
 Claws not toothed basally, usually long and slender; dorsum punctate or impunctate Cylapinae

KEYS TO THE GENERA OF ORTHOTYLINAE AND PHYLINAE OF AFRICA SOUTH OF THE SAHARA

The following keys are divided into three basic sections. The first deals with genera that have fleshy, apically convergent, recurved parempodia, and also genera with weakly fleshy parempodia that are slightly convergent apically; this includes the Orthotylinae, Pilophorini, and certain genera in the Phylini. The second section deals with those genera that have hair-like parallel parempodia and also genera with weakly fleshy convergent parempodia that are also included in the first section of the key; this includes only the Hallo-dapini, Leucophoropterini, and Phylini. The third section deals with brachypterous forms in the Orthotylinae and Phylinae. Those genera of the Orthotylinae and Phylinae known to occur in Africa south of the Sahara that are not included in the keys are *Atractotomus* Fieber, *Bibundiella* Poppius, *Brachycranella* Reuter, *Chaetocapsus* Poppius, *Dimorphocoris* Reuter, and *Leptoxanthus* Reuter; *Marmorodapus* Schmitz keys to *Trichophorella* Reuter. Genera that are followed by the name of the author are not generally treated in detail elsewhere in the paper.

Genera with convergent parempodia

1. Ant mimetic, brown or black, with light maculae or transverse fasciae on hemelytra, at least at base of cuneus; lateral corial margins always sinuate 2
 Non-mimetic (see however *Pilophorus*), color variable, without distinct light maculae or fasciae; lateral corial margins only rarely sinuate 3
2. Pronotum strongly constricted just anterior to middle, posterior lobe tumid, anterior lobe narrow, neck-like (Fig. 7); scutellum without long erect hairs *Pseudonichomachus*
 Pronotum not strongly constricted near middle, posterior lobe tumid, anterior lobe short, not distinctly neck-like (Fig. 5); scutellum with a few long erect hairs *Nichomachus*
3. Pronotum very heavily punctured; dorsum entirely black 4
 Pronotum not heavily punctured; coloration of dorsum variable 5

4. Antennal segment 2 enlarged, spindle shaped, greater in diameter than segment one, densely covered with semierect stout hairs
..... *Millerimiris* Carvalho
Antennal segment 2 cylindrical, not enlarged, diameter slightly less than that of segment one, with fine reclining pubescence
..... *Nanniella*
5. Entire body and all appendages with long erect black hairs; pronotum swollen posteriorly; cuneal incisure deep; red and black
..... *Namaquacapsu*
Pubescence not as above; pronotum and color variable 6
6. Head short, wide, flattened anteroposteriorly, concave behind; posterior margin of vertex finely carinate, head tending to obscure anterior margin of pronotum 7
Head not particularly short, flattened, or concave behind, posterior margin of vertex not finely carinate, head not obscuring anterior margin of pronotum 14
7. Lateral corial margins distinctly sinuate; hemelytra with a few transverse patches of sericeous appressed, scale-like hairs *Pilophorus*
Lateral corial margins never sinuate, either straight or convex; hemelytra never with transverse patches of scale-like hairs, although often with decumbent, sericeous, wooly hairs 8
8. Dorsum with single type of pubescence, without flattened or wooly hairs 9
Dorsum with reclining setiform hairs and decumbent, sericeous, wooly hairs 10
9. Entirely black, including all appendages; antennal segment 2 about four-fifths width of head across eyes *Parambonea*
Not entirely black; antennal segment 2 subequal to width head across eyes *Pseudambonea*
10. Antennal segment 2 distinctly laminate, broadest medially *Druthmarus* Distant
Antennal segment 2 cylindrical, not flattened 11
11. Relatively small species about 3.5 mm. long; basically cream colored; pronotum, apex of corium, and sometimes cuneus, red
..... *Aloea*
Size variable; coloration never light with distinct red markings 12
12. Entirely black, excluding appendages *Neoambonea*
Body not entirely black 13
13. Abdominal venter with decumbent, wooly, sericeous hairs; vesica in male U-shaped, gonopore subapical (Fig. 318) *Ambonea*
Abdominal venter with only reclining setiform hairs, without wooly sericeous hairs; vesica forming nearly complete coil, gonopore apical (Figs. 332, 335) *Paramixia*

14. Head convexly rounded behind eyes, eyes removed from anterior margin of pronotum by distance about equal to or greater than diameter of antennal segment 2 (Fig. 14); body elongate, flattened; hemelytra often hyaline or subhyaline 15
 Head not convexly rounded behind eyes, posterior margin of eyes contiguous with anterior margin of pronotum or nearly so; body not particularly elongate or flattened; hemelytra seldom hyaline 19
15. Clavus usually with distinct row of punctures more or less parallel to claval suture (see however *Zanchiella sweeti* and *Z. ericae*) 16
 Clavus without row of punctures as above 17
16. Antennal segment 1 about as long as width of head across eyes; all appendages very long *Felisacodes*
 Antennal segment 1 about as long as interocular space *Zanchiella*
17. Antennal segment 1 longer than width of head across eyes, considerably enlarged, about three times diameter of segment 2, densely covered with stout hairs *Uleana* Carvalho
 Antennal segment 1 shorter than width of head across eyes, not greatly enlarged or more than one and a half times diameter of segment 2, without conspicuous stout hairs 18
18. Eyes set forward on head, removed from anterior pronotal margin by about half (or nearly so) diameter of eye (Fig. 19) *Zanchius*
 Eyes removed from anterior margin of pronotum by about diameter of antennal segment 2 (Fig. 9) *Cyrtorhinus*
19. Antennal segment 1 about as long as width of interocular space plus one eye, distinctly enlarged, rather densely covered with erect or semierect often dark hairs about as long as diameter of segment; coloration usually red and white or almost entirely red *Pseudoloxops*
 Antennal segment 1 usually about as long as width of interocular space, only moderately enlarged, pubescence short, inconspicuous, reclining or decumbent; coloration variable 20
20. Clypeus, juga, and lora brown or black, highly polished, shining, strongly contrasting in texture and usually in coloration with remainder of head 21
 Clypeus, juga, and lora not strongly contrasting with remainder of head in texture and coloration, although sometimes black and shining 22
21. Males elongate, lateral corial margins nearly straight; females ovate, brachypterous, hemelytra just covering abdomen; male genital capsule without ventral keel *Capecapsus*
 Ovate; lateral corial margins distinctly convex; both sexes macrop-
 terous; male genital capsule with keel ventrally *Ellenia*

22. Small, length 3.0 mm. or less; body black; metafemora conspicuously enlarged; height of head below eyes greater than height of eye *Halticus*
 Size and color variable, body never totally black; metafemora not conspicuously enlarged; height of head below eyes about two-thirds height of eye or less 23
23. Parempodia recurved (Orthotylinæ); usually elongate, green, although sometimes red or brown; antennal segment 3 about two-thirds length of segment 2; usually over 3.5 mm. long
 *Orthotylus* and *Pseudorthotylus* Poppius
 Parempodia not recurved (Phylinæ); usually ovate or under 3.5 mm. long; antennal segment 3 less than two-thirds length of segment 2 24
24. Dorsum with only reclining, black, setiform hairs; frons strongly convex *Widdringtoniola*
 Dorsum with reclining setiform hairs and clumps of wooly sericeous hairs *Stibaromma* Odhiambo

Genera with hair-like parallel parempodia

1. Pronotum often strongly narrowed anteriorly, often with a distinct flattened collar at least as wide as diameter of antennal segment 2 (see *Karoocapsus*); hemelytra usually dark with one or more light maculae or fasciae contrasting with basic coloration; often strongly ant mimetic; pulvilli always minute (Hallodapini, Leucophoropterini in part) 2
 Pronotum sometimes narrowed anteriorly and with flattened collar; if pronotal collar present, eyes substylate or stylate; hemelytra never with contrasting maculae or fasciae; seldom appearing ant mimetic; pulvilli usually minute, sometimes long and free apically or long and fused with claw (Phylini, Leucophoropterini) 24
2. Anterior pronotal margin finely carinate, upturned, not in the form of flattened collar; head, pronotum, and scutellum with reclining, dark, setiform hairs and appressed, flattened, sericeous, scale-like hairs (the latter are very easily rubbed off); usually with two or three yellow maculae strongly contrasting with dark hemelytra (Figs. 42-49) *Karoocapsus*
 Anterior pronotal margin always in the form of flattened collar, at least as wide as diameter of antennal segment 2; vestiture of dorsum variable, never with appressed, scale-like, sericeous hairs; coloration variable, maculae or fasciae usually white if present 3
3. Vertex produced into spine above clypeus (Figs. 23, 24)
 *Acrorrhinium*
 Vertex not produced into spine 4

4. Eyes set far forward on head, removed from anterior margin of pronotum by distance equal to at least diameter of eye (Figs. 36, 37, and 38) 5
 Eyes contiguous with anterior margin of pronotum or nearly so, not removed by more than distance equal to diameter of antennal segment one (Figs. 26, 30, and 39) 7
5. Scutellum produced into sharp spine about as high as pronotum *Myombea*
 Scutellum flat or rounded, not produced into spine 6
6. Antennae inserted at about midpoint of anterior margin of eyes, fossae nearly contiguous with eyes *Formicopsella*
 Antennae inserted below ventral margin of eyes, fossae removed from eyes by distance equal to diameter of antennal segment 1 *Skukuza*
7. Hemelytra with at least one light macula or fascia contrasting with dark background; basic coloration never solid black 8
 Hemelytra without contrasting maculae or fasciae or if with fascia then basic coloration solid black 20
8. Head concave behind; posterior margin of vertex carinate, produced posteriorly over pronotal collar; scutellum strongly protuberant (Fig. 25) 9
 Head either weakly convex behind forming short neck, or neck obsolete and posterior margins of eyes contiguous with anterior margin of pronotum; posterior margin of vertex not carinate (although sometimes with low rounded transverse ridge between eyes); scutellum sometimes protuberant 10
9. Gula with distinct longitudinal carina; gula at least as long as diameter of antennal segment one; southern Africa *Carinogulus* (in part)
 Gula without carina; length of gula less than diameter of antennal segment one, buccal cavity sometimes contiguous with prosternum; northern Africa *Glaphyrocoris* Reuter and *Hypominus* Lindberg
10. Gula with distinct longitudinal carina; gula at least one and a half times length of diameter of antennal segment one; scutellum strongly protuberant; eyes removed from anterior margin of pronotum by distance about equal to diameter of antennal segment one; dorsum with some long, erect hairs *Carinogulus* (in part)
 Gula without distinct carina, length variable; scutellum occasionally protuberant or spiniform; eyes either contiguous with or slightly removed from anterior margin of pronotum; dorsal vestiture variable 11
11. Head greatly elongated dorsoventrally; gula almost vertical, nearly as long as height of eye; hemelytral fascia broad laterally, narrowed mesially, forming transverse hourglass-shaped marking

- on corium; metatibiae slightly to strongly flattened
Diocoris and *Gampsodema* Odhiambo
- Head only moderately elongated dorsoventrally, length of gula less than one-half height of eye, or head not at all elongated and gula very short 12
12. Length of gula about one-half height of eye, gula nearly vertical *Systellonotus*
 Gula never longer than diameter of antennal segment one, often obsolete and buccal cavity contiguous with prosternum 13
13. Dorsum with long, erect hairs nearly as long or longer than diameter of antennal segment one, and with or without shorter decumbent hairs 14
 Dorsum never with long, erect hairs although occasionally with short, erect hairs, and always with short, decumbent hairs 18
14. Species always with wing-edge stridulatory mechanism; lateral corial margin always lacking projecting hairs and possessing fine serrations (sometimes not visible even under high magnification); inner surface of metafemora pebbled or otherwise modified into stridulatory plectrum, always glabrous; at least metatibiae with very long spines 15
 Species without wing-edge stridulatory mechanism; lateral corial margins usually with projecting hairs, always lacking serrations; inner surface of metafemora may be finely granulose, never distinctly pebbled or otherwise modified into stridulatory plectrum, usually with distinct pubescence; metatibiae without extremely long spines 17
15. Eyes of males very large (Figs. 33, 34), much larger than those of females, occupying nearly entire sides of head and reaching almost to bucculae; lateral corial margin distinctly sinuate; corium with single transverse fascia medially; metatibiae usually broadened medially, spindle-shaped *Trichophthalmocapsus*
 Eyes in males not extremely large, only slightly larger than those of females, genal area exposed; lateral corial margin and hemelytral markings variable; metatibia usually cylindrical 16
16. Scutellum in males usually spiniform; females brachypterous, pronotum strongly swollen, scutellum swollen, not spiniform as in males *Laemocoris*
 Scutellum in males more or less flat; females usually brachypterous, pronotum and scutellum not highly modified, similar in structure to males *Hallodapus* (in part)
17. Small species, always less than 4.5 mm. long; posterior margins of eyes contiguous with anterior margin of pronotum *Hallodapus* (in part)
 Larger species, about 4.5 mm. long; posterior margins of eyes slightly removed from anterior margin of pronotum
 *Systellonotopsis*

18. Eyes in males very large, occupying nearly entire sides of head and reaching almost to bucculae *Boopidella*
 Eyes in males not extremely large, genal area exposed (eyes of females only slightly smaller than those of males) 19
19. Small species, always less than 4.5 mm. long *Hallodapus* (in part)
 Larger species, at least 5.0 mm. long *Pangania*
20. Basic coloration velvety black, sometimes with broad white hemelytral fascia *Syngonus* Bergroth
 Basic coloration not black, usually light brown, often mottled 21
21. Slender bodied, ratio of total length to greatest width at least 3:1 *Trichophorella*
 More heavy bodied than above, ratio of total length to width 2.75:1 or less 22
22. Antennal segment 3 longer than segment 2 *Kapoetius* Schmitz
 Antennal segment 2 longer than segment 3 23
23. Metalegs, antennae, and most of dorsum marmorate *Aeolocoris*
 Legs, antennae, and dorsum more or less solid color, hemelytra sometimes with a few light markings *Azizus*
24. Eyes stylate, width of head across eyes nearly equal to or greater than width of posterior margin of pronotum; pronotum anteriorly with wide flat collar; black *Eminoculus*
 Eyes not distinctly stylate, sometimes substylate; head rarely as wide as posterior margin of pronotum; pronotum never with flattened collar; color variable, but if eyes substylate never solid black 25
25. Dorsum heavily punctate; black 26
 Dorsum never heavily punctate; if black seldom highly polished; head rarely very short 27
26. Antennal segment 2 enlarged, greater in diameter than segment 1 *Millerimiris* Carvalho
 Antennal segment 2 linear, of smaller diameter than segment 1 *Lamprosthenarus*
27. Antennal segment 2 conspicuously enlarged distally, diameter about equal to or greater than diameter of segment 1 and of much greater diameter than that of segments 3 and 4 28
 Antennal segment 2 not conspicuously enlarged, seldom more than two-thirds diameter of segment 1, not more than 2 times diameter of segments 3 and 4 29
28. Antennal segment 2 thickened distally to about two times proximal diameter; black *Rakula* Odhiambo
 Antennal segment 2 nearly uniformly thickened over entire length; reddish *Lepidocapsus*
29. Eyes substylate, head transverse, width across eyes nearly as great as maximum width of pronotum; body densely covered with flattened, appressed, scale-like hairs 30

- Eyes not substylate; dorsum, if at all, only partially covered with appressed, scale-like hairs, although sometimes rather densely covered with decumbent wooly pubescence 31
30. Antennal segment one short, cylindrical; antennae lacking scale-like hairs; tibiae without dark spines; coloration not entirely black, hemelytra with large light areas *Lasiolabopella*
 Antennal segment one long, increasing in diameter distally; antennae with scale-like hairs; tibiae with dark spines; black
 *Lasiolabops* Poppius
31. Pulvilli enlarged, flattened, free from claw apically, reaching to about apex of claw; clypeus prominent 32
 Pulvilli usually very small, occasionally enlarged and fused with nearly entire ventral surface of claw 33
32. Dorsum rather densely covered with semierect or reclining, dark, heavy, setiform hairs *Denticulophallus*
 Dorsum with only fine reclining hairs or with reclining hairs and decumbent wooly pubescence *Macrotylus*
33. Head including eyes concave behind, vertex finely carinate; anterior margin of pronotum obscured by posterior margin of head; small species, under 3.5 mm. long, body ovoid
 *Sthenarus-Campylomma*
 Head and eyes either convex or only weakly concave behind; posterior margin of vertex sometimes finely carinate and obscuring anterior margin of pronotum; if species under 3.5 mm. long, head never concave behind and not obscuring anterior margin of pronotum; species usually over 4.0 mm. long, moderately elongate 34
34. Dorsum with two distinct types of pubescence, usually with reclining setiform hairs and decumbent, somewhat flattened, wooly, sericeous pubescence, or very seldom with some clumps of scale-like, appressed sericeous hairs 40
 Dorsum with single type of pubescence, never with wooly sericeous hairs 35
35. Pulvilli large, fused with almost entire ventral surface of claw
 *Parasciodema*
 Pulvilli minute 36
36. Antennal segment 2 about 1.4 times as long as width of posterior margin of pronotum; elongate black species; labium just surpassing procoxae *Natalophylus*
 Antennal segment 2 equal to or less than width of posterior margin of pronotum; shape, color, and labial length variable 37
37. Small, light colored species; dorsum with reclining black hairs or inconspicuous light hairs 38
 At least pronotum dark; vestiture usually conspicuous, never only of black hairs 39

38. Dorsum with only reclining, black, setiform hairs; frons convex, clypeus not visible from above; parempodia weakly fleshy, convergent apically *Widdringtoniola*
 Dorsum with decumbent, fine, light hairs; frons produced anteriorly, clypeus prominent as viewed from above; parempodia hair-like and parallel *Plagiognathidea*
39. Ratio of length of head to width of head about 1:1.25; all femora light at least proximally *Tytthus*
 Ratio of length of head to width of head 1:4; all femora dark at least proximally *Odhiamboella*
40. Head, pronotum, and scutellum (also mesepisterna and metepisterna) with flattened, appressed, sericeous, scale-like hairs; hemelytra mostly with reclining setiform hairs except for a few scale-like hairs along claval suture; antennal segment 2 at least as long as width of posterior margin of pronotum and up to 1.6 times pronotal width; elongate species, usually with yellow maculae contrasting with dark background, sometimes solid brown or with inconspicuous maculae (Figs. 42-49)
 *Karoocapsus*
 Dorsum including hemelytra usually rather densely covered with decumbent, sericeous, wooly hairs and semierect or reclining setiform hairs, never with scale-like hairs as above; length of antennal segment 2 and coloration variable 41
41. Small, 3.5 mm. long or less; light colored with variable markings (Fig. 82); labium very long, reaching to middle of abdomen; antennal segment 2 at least as long as width of posterior margin of pronotum *Stoebea*
 Usually over 3.5 mm. long; coloration either light or dark, if light usually with many dark spots on dorsum or unicolorous and labium reaching to or surpassing mesocoxae; if dark usually brown or black, unicolorous and labium short, reaching only slightly past procoxae at most; length of antennal segment 2 variable 42
42. Labium short, not or only slightly exceeding posterior margin of procoxae; brown or black 43
 Labium long, surpassing mesocoxae; usually light with heavily spotted dorsum; if labium just surpassing procoxae, clypeus, juga, and lora black, highly polished 45
43. Clypeus, juga, and lora at and below level of antennal bases black or dark brown, highly polished, shining, remainder of head dull or only weakly shining; parempodia weakly fleshy, convergent apically *Capecapsus*
 Clypeus, juga, and lora not highly polished or differing in texture from remainder of head; parempodia hair-like, parallel 44
44. All tibiae and antennae black; male genitalia as in Figs. 289-292
 *Parapseudosthenarus*

- All tibiae light with black spines with black bases; male genitalia as in Figs. 293–312 *Pseudosthenarus*
45. Clypeus, juga, and lora at and below level of antennal bases, black, highly polished, contrasting with remainder of head 46
 Clypeus, juga and lora unicolorous with surrounding areas of head and of same texture 47
46. Parempodia hair-like, parallel; vesica of male usually forming a loop (Figs. 238, 241–243); dorsum usually with heavy black setiform hairs; females brachypterous; male genital capsule without ventral keel *Coatonocapsus*
 Parempodia weakly fleshy, convergent apically; vesica in male not forming a loop (Fig. 248); dorsum with fine, dark, setiform hairs; females macropterous; male genital capsule with ventral keel *Ellenia*
47. Membrane marmorate; antennal segment 2 enlarged distally, clavate *Anapsallus* Odhiambo
 Membrane not marmorate, unicolorous or cells differing in coloration from remainder of membrane; antennal segment 2 linear or nearly so, not clavate 48
48. Large species, macropterous forms over 4.0 mm. long; dorsum with long, semierect setiform hairs; females occasionally brachypterous; parempodia hair-like, parallel *Austropsallus*
 Smaller species, less than 4.5 mm. long; dorsum with reclining, relatively short, setiform hairs; females macropterous; parempodia often slightly fleshy and weakly convergent apically 49
49. Woolly, sericeous hairs on dorsum in distinct patches; vesica long, forming complete loop *Stibaromma* Odhiambo
 Woolly sericeous hairs on dorsum (sometimes absent) more or less uniformly distributed; vesica short (e.g., Fig. 248) *Psallus*

Genera with submacropterous and brachypterous forms

1. Hemelytra greatly reduced, about the same length as pronotum or less, covering only base of abdomen (Figs. 6 and 37); ant mimetic 2
 Hemelytra reduced, either just covering abdomen or covering about half of abdomen, but never less than one and a half times length of pronotum (Figs. 32, 57, and 61); ant mimetic or not 4
2. Eyes removed from anterior margin of pronotum by distance greater than diameter of eye; anterior lobe of pronotum small
 *Skukuza*
 Eyes contiguous with anterior margin of pronotum; anterior lobe of pronotum variable 3
3. Scutellum swollen, protuberant; parempodia fleshy, convergent apically, recurved *Nichomachus*
 Scutellum flat, not swollen; parempodia hair-like, parallel
 *Karoocapsus*

4. Hemelytra covering about half of abdomen, often truncate posteriorly (Figs. 24 and 65); sometimes ant mimetic 5
Hemelytra just covering abdomen, often appearing fully winged in absence of comparison with macropterous forms (Fig. 57) 9
5. Eyes stylate, head conspicuously produced laterally beyond antero-lateral angles of pronotum; shining black; coleopteroid *Eminoculus*
Eyes not stylate although may be protuberant; not entirely black; not coleopteroid 6
6. Frons with distinct spine projecting over clypeus (Fig. 24) *Acrorrhinium*
Frons without spine as above 7
7. Eyes removed from anterior margin of pronotum by distance equal to at least diameter of eye; ant mimetic *Formicopsella*
Eyes contiguous with anterior margin of pronotum 8
8. Pronotum with posterior lobe strongly swollen, elevated high above hemelytra; scutellum swollen *Laemocoris*
Pronotum with posterior lobe not strongly swollen; scutellum nearly flat (Fig. 32) *Hallodapus*
9. Labium short, not or only slightly exceeding procoxae 10
Labium long, reaching at least to mesocoxae, occasionally to middle of abdomen 12
10. Clypeus, juga, and lora nearly black, highly polished, contrasting with dull surface of remainder of head; parempodia weakly fleshy, convergent apically *Capecapsus*
Clypeus, juga, and lora not strongly contrasting with remainder of head in color and surface texture; parempodia hair-like and parallel 11
11. Tibiae light with black spines with black bases *Pseudosthenarus*
Tibiae black with black spines *Parapseudosthenarus*
12. Clypeus, juga, and lora black, highly polished, shining, strongly contrasting with remainder of head *Coatonocapsus*
Clypeus, juga, and lora neither black nor strongly shining, not contrasting with remainder of head in color and surface texture 13
13. Antennae with numerous erect, black hairs about three times as long as diameter of segment on which they occur *Austropsallus*
Antennae without long, erect, black hairs 14
14. Hemelytra cream, pronotum, scutellum, and macula at cuneal fracture red; parempodia fleshy, convergent apically, recurved *Aloea*
Dorsum generally light with reddish, greenish, or brownish markings; parempodia hair-like and parallel *Stoebea*

SUBFAMILY ORTHOTYLINAE
TRIBE HALTICINI

Namaquacapsus, new genus

MACROPTEROUS MALE: Robust; entire dorsum, thoracic pleura, abdominal venter, femora, and tibiae densely covered with erect black hairs about two and a half times as long as tibial diameter; antennal segment one with a few, erect, fine spines, segments 2, 3, and 4 with short reclining pubescence and a few long, erect, black hairs; labium with short erect hairs.

Head short, deflexed; eyes weakly granular, about half height of head; frons convex between antennal bases; antennal segment one moderately enlarged, swollen medially, segment 2 with proximal half narrow, distal half enlarged to about one and a half times diameter of proximal half, approaching diameter of segment one, segments 3 and 4 subequal in diameter (4 missing in holotype), slightly less than proximal diameter of segment 2; clypeus large, flattened dorsally, rounded ventrally; bucculae narrow; buccal cavity large, broad; gula about half length of distal diameter of antennal segment 2; pronotum with flattened collar about as wide as proximal diameter of antennal segment 2; lateral pronotal margins nearly straight posteriorly, broadly rounded anteriorly; calli obsolete; pronotum with anterior lobe short, depressed behind collar, posterior lobe elevated, inflated, mesoscutum obscured by pronotum; scutellum strongly convex, clavi steeply declining laterally from scutellum and commissure; corium rounded transversely, lateral margins strongly convex; cuneal incisure very deep, fracture perpendicular to longitudinal axis of body; cuneus strongly convex laterally; membrane with two cells; tibiae without rows of tiny, closely spaced spines; tarsal claws relatively short, weakly curved; parempodia fleshy, convergent apically, recurved; pulvilli minute.

MALE GENITALIA: Figures 100, 101. Vesica membranous.

Female unknown.

TYPE SPECIES: *Namaquacapsus melanostethoides*, new species.

This genus is named for Namaqualand, the region of the type locality of *Namaquacapsus melanostethoides*.

Namaquacapsus is placed in the Halticini because of the flattened pronotal collar, dorsoventrally elongated head, dark coloration, and the structure of the male genitalia. The genus appears to be most closely related to *Orthocephalus* Fieber, from Europe and the Mediterranean, by virtue of the heavy vestiture and body

shape. *Namaquacapsus* shows specialized features within the Halictini, particularly in the type of vestiture and the reddish coloration of the hemelytra; the former condition may be an adaptation to an extremely arid environment.

***Namaquacapsus melanostethoides*, new species**

Figures 1, 100, 101

MACROPTEROUS MALE: Basic coloration deep castaneous; anterior two-thirds and apex of corium and anterior two-thirds of cuneus red.

Head, pronotum, scutellum, antennae, labium, legs, and abdominal venter polished, shining; remainder of body, including anterior lobe of pronotum dull; eyes glabrous.

Posterior margin of vertex nearly straight, with broad rounded carina; antennae removed from margins of eyes; labium just surpassing mesocoxae; pronotum with anterior margin sinuate, posterior margin straight across mesoscutum, broadly rounded laterally; abdomen reaching to apex of corium; metatarsal segments 1 and 3 subequal in length, segment 2 about two-thirds length of segment 3.

MEASUREMENTS: Total length 5.36, maximum width 2.16, length head .60, width head .76, interocular space .60, length pronotum 1.00, width pronotum 1.92, length scutellum .64, width scutellum .96, length corium 2.36, length clavus 2.00, length cuneus 1.04, width cuneus .92, length claval commissure 1.04, distance apex commissure-apex membrane 2.36, length metatibia 1.92; length antennal segments 1—.32, 2—1.30, 3—.88, 4—.38 (from paratype); length labial segments 1—.42, 2—.42, 3—.20, 4—.40.

MALE GENITALIA: Figures 100, 101.

HOLOTYPE: Macropterous male, SOUTH AFRICA: *Cape Province*, Kamieskroon, Namaqualand, Museum Staff, Sept. 1930 (SAM).

PARATYPE: 1 macropterous male, same data as holotype (RTS).

This species is named for its similarity to *Melanostethus* Stål (Lygaeidae) in general coloration.

Namaquacapsus melanostethoides can be recognized by its dark red and almost black coloration and extremely long, dense, black pubescence.

No host or ecological data are available.

Nanniella Reuter

Nanniella Reuter, 1904, p. 6.

Nanniella was described by Reuter (1904) for a single species, *N. chalybea* Reuter, from Kinshasa; Poppius (1914a) added *N. reuteri* Poppius from "Nyassa." Both authors placed the genus in the Halticini. *Nanniella* was synonymized with *Falconia* Distant by Carvalho (1952a), but no explanation was given for the action. Comparison of type specimens of *F. poetica* Distant, the type species of the genus, from South America, and *Nanniella* from Africa, indicates that there is indeed a very close superficial resemblance between the two genera. However, a careful examination reveals that in fact they are much less closely related than general facies would indicate. The parempodia in both *Falconia* and *Nanniella* are apically convergent and recurved. The female genitalia, however, are diagnostic for the two genera: in *Falconia* the posterior wall possesses well developed K-structures characteristic of the Orthotylini; in *Nanniella* the posterior wall is a simple sclerotized plate and lacks K-structures, a feature which in combination with the convergent parempodia suggests that the genus belongs to the Halticini. Additional characters supporting this tribal placement for *Nanniella* are: the solid black coloration; the flattened, rather broad, pronotal collar; the club-shaped right clasper; the simple membranous vesica; and the dorsoventrally elongated head. *Nanniella* does not have noticeably enlarged hind femora, which are characteristic of most members of the Halticini.

Nanniella can be recognized by its heavily punctate, shining, black dorsum, vertical head with protuberant eyes removed from the anterior margin of the pronotum, and flattened pronotal collar. It is most closely related to *Acratheus* Distant from India, which is also heavily punctate on the dorsum. *Acratheus* has a light cuneus and membrane whereas in *Nanniella* the entire dorsum is black.

The available material suggests that several closely related species of *Nanniella* are present in Africa. Three specimens are known from South Africa which agree generically with the type series of *N. chalybea* deposited in the Musée Royal de l'Afrique Central, and a specimen identified by Poppius as *chalybea* in the Helsinki Museum which is from Kinshasa. A male from Sarnia, Natal (Fig. 2), deposited in the British Museum (Natural History), and a female from Umkomaas, Natal, deposited in the South African National Collection of Insects, have completely brown antennae and a band of dense wooly hairs immediately posterior to the pro-

notal collar. A female from Albert Falls, Umgeni River, Natal, deposited in the Lund University Collection (see Carvalho, et al., 1960), has dark antennae, but lacks the band of wooly hairs on the pronotum and has distinctly brown tibiae, whereas in other specimens from South Africa the tibiae are light. Specimens of *N. chalybea* from Kinshasa, Congo, have the first antennal segment light and lack the band of wooly hairs on the pronotum.

At the present time it seems undesirable to assign names or describe new species until a careful study of *Nanniella* and *Acratheus* is undertaken.

Halticus Hahn

Halticus Hahn, 1832, p. 113.

Only two species of the cosmopolitan genus *Halticus* are currently recorded from Africa (Carvalho, 1958b). A male specimen from Satara Camp, Kruger National Park, Transvaal, deposited in the J. A. Slater Collection, probably represents a new species. It has the second antennal segment about three times as long as the first, the femora generally black, and the posterior margin of the vertex narrowly white.

NICHOMACHINI, new tribe

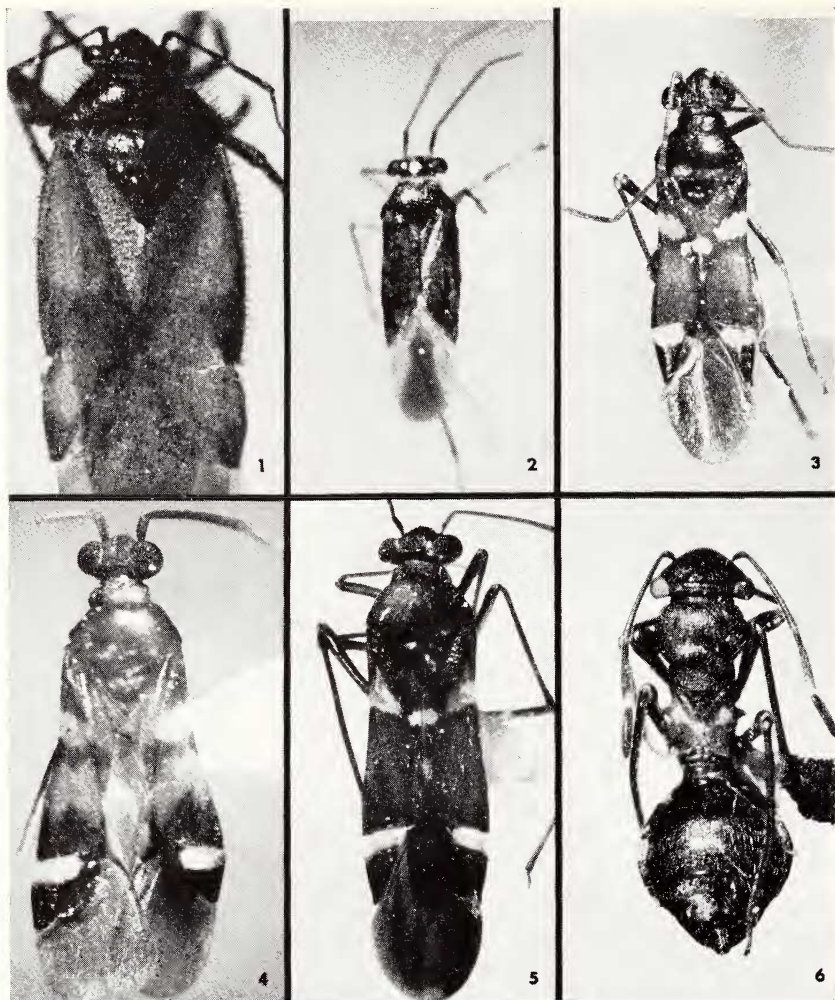
Nichomachus Distant

Nichomachus Distant, 1904a, p. 104.

Nichomachus can be characterized by the following redescription of the genus.

MACROPTEROUS MALE: Elongate, ant mimetic; head, pronotum, and scutellum granulose or rugulose, dull or weakly shining; corium and clavus mostly pruinose; basal fifth of corium and clavus, cuneus, cell of membrane, legs, and venter polished, shining; pronotum, scutellum, cuneus, femora, and antennal segment 1 with short, decumbent, sericeous hairs; scutellum, clavus, and corium with a few long, erect, shining hairs; antennal segments 2, 3, and 4 with dense short vestiture; tibiae with a few semierect spines about as long as tibial diameter.

Head nearly vertical, concave behind; vertex depressed between eyes, posterior margin carinate; frons transversely rugose, weakly convex, with faint longitudinal sulcus; eyes large, occupying entire sides of head; antennae inserted just above ventral margin of eyes, fossae contiguous with eyes; antennal segment 1 slightly enlarged,



FIGS. 1-6. Halticini, Nichomachini. Fig. 1. *Namaquacapsus melano-stethoides*, male, holotype. Fig. 2. *Nanniella* near *chalybea*, male (Sarnia, Natal). Fig. 3. *Nichomachus minutus*, male, holotype. Fig. 4. *Nichomachus rufescens*, male, holotype. Fig. 5. *Nichomachus sweeti*, male, holotype. Fig. 6. *Nichomachus sweeti*, female (Schoemannspoort, Cape Province).

segments 2 and 3 subequal in diameter, about three-fourths diameter of segments 1 and 4; labium just surpassing posterior margin of metasternum; pronotum with anterior lobe about one-fifth length of entire pronotum, forming poorly defined neck, anterior margin carinate, upturned, posterior lobe tumid; mesoscutum inclined anteriorly; scutellum strongly inflated, bulbous; lateral corial margins weakly sinuate, reflexed ventrally on anterior half, cuneal incisure obsolete; membrane with two cells; abdomen long, slender, just surpassing apex of cuneus; parempodia fleshy, convergent apically, recurved; pulvilli minute.

MALE GENITALIA: Figures 96, 97. Left clasper long, slender, with a barb apically, basal lobe with spine formed of long, stiff, erect hairs; left clasper situated as in Figure 93A; right clasper extremely small, lanceolate; vesica membranous, with minute spines.

BRACHYPTEROUS FEMALE: See *Nichomachus sweeti*.

FEMALE GENITALIA: Figures 98, 99. Ring glands very small, contorted; posterior wall a simple sclerotized plate, oriented cephalocaudad.

Nichomachus is most closely related to *Pseudonichomachus*, but can be separated from it by the form of the anterior lobe of the pronotum, which is short in the former and long and neck-like in the latter. Distant (1904a) related *Nichomachus* to *Systellonotus*. Carvalho (1952a) placed the genus in the Pilophorini. The structure of the male and female genitalia and the type of sexual dimorphism in *Nichomachus* show no close relationship to the Pilophorini or *Systellonotus*, but suggest that the genus belongs to a distinct evolutionary line within the Orthotylineae. I have therefore placed it in a new tribe with several other Ethiopian genera (see tribal classification below).

A brachypterous female from Swartberg Pass, 25 miles north of Oudtshoorn, Cape Province and deposited in the J. A. Slater Collection, may be congeneric with *Nichomachus*. This specimen has an hourglass-shaped pronotum which is, however, very much different from the pronotum of *N. sweeti*. An additional female specimen from Mkuze Game Reserve, Natal, which is deposited in the J. A. Slater Collection, also appears to be related to *Nichomachus*. It is submacropterous, with only the connexival region of the dorsally flattened abdomen being exposed. The head is very similar in structure to that of *N. sweeti*, but the pronotum is hourglass-shaped, and similar in structure to that of the abovementioned female from the Swartberg Pass.

The four described species of *Nichomachus* are all from South-

ern Africa. The genus does not seem to be associated with the tropical African vegetative element but with the Southwest Cape related flora.

KEY TO MACROPTEROUS SPECIMENS OF *Nichomachus*

1. Dorsum mostly red or reddish brown, except for white hemelytral maculae 2
 Dorsum nearly uniform dark brown or black except for white hemelytral maculae 3
2. Scutellum dark brown, contrasting with reddish pronotum and corium; clavi with white transverse macula at about midpoint of claval commissure *sloggetti*
 Scutellum unicolorous with pronotum and corium; clavi without white macula *rufescens* (Fig. 4)
3. Large black species, 4.80 mm. long; distal fifth of antennal segment 3 usually white *sweeti* (Fig. 5)
 Smaller, dark brown species, 4.24 mm. long; antennal segment 3 unicolorous brown *minutus* (Fig. 3)

***Nichomachus minutus*, new species**

Figure 3

MACROPTEROUS MALE: Basic coloration dark brown or castaneous; most of corium and clavus lighter brown than remainder of body; membrane smoky brown; hemelytra with white macula on basal third of corium, on calvi at about midpoint of claval commissure, and on basal third of cuneus; posterior margin of metepisternum white; scutellum and cuneus strongly shining.

MEASUREMENTS: Total length 4.24, maximum width 1.14, length head .36, width head .80, interocular space .34, length pronotum .70, width pronotum .98, length scutellum .46, width scutellum .46, length corium 1.74, length clavus 1.16, length cuneus .60, width cuneus .44, length claval commissure .76, distance apex commissure-apex membrane 1.78, length metatibia 1.80, length antennal segments 1—.30, 2—1.02, 3—.80, 4—.62; length labial segments 1—.36, 2—.24, 3—.52, 4—.42

MALE GENITALIA: Basic structure as in *N. sweeti*.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: Cape Province, 4 mi. W. Gydo Pass summit, N. of Ceres, 26 Jan. 1968, J. A. & S. Slater, T. Schuh, M. H. Sweet (SANC).

This species is named for its relatively small size.

Nichomachus minutus most closely resembles *N. sweeti* but is much smaller and is generally brown rather than black.

The type locality was a dry sandy wash with macchia vegetation.

Nichomachus rufescens, new species

Figure 4

MACROPTEROUS MALE: Basic coloration bright brownish orange; corium at level of apex of scutellum with broad, transverse, transparent band; corium with complete, brown, transverse fascia contiguous with posterior margin of transverse band above; basal two-fifths of cuneus white, apical three-fifths castaneous; membrane light smoky brown; abdomen yellowish basally, castaneous apically; antennal segments 1 and 2 and metafemur only appendages present on holotype.

MEASUREMENTS: Total length 4.80, maximum width 1.22, length head .38, width head .92, interocular space .26, length pronotum .74, width pronotum 1.22, length scutellum .64, width scutellum .72, length corium 2.20, length clavus 1.68, length cuneus .80, width cuneus .48, length claval commissure .68, distance apex commissure-apex membrane 2.26; length antennal segments 1—.36, 2—1.42, 3—?, 4—?; length labial segments 1—.52, 2—.56, 3—.42, 4—.56.

MALE GENITALIA: Basic structure as in *N. sweeti*.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Bulshoek, Clw., S.A.M., 12-56 (SAM).

This species is named for its reddish coloration.

Nichomachus rufescens is most similar to *N. sloggetti* and also resembles *Pseudonichomachus capeneri*. The absence of the white transverse macula on the posterior portion of the clavus in *rufescens* will separate it from *sloggetti*. The generic differences in the shape of the pronotum will separate *rufescens* from *P. capeneri*.

Nichomachus sloggetti Distant

Nichomachus sloggetti Distant, 1904a, p. 104.

Distant's original description from a single macropterous male and the preceding key will distinguish *N. sloggetti* from congeneric species. The coloration of *sloggetti* is very similar to that of *N. rufescens* and also resembles closely that of *Pseudonichomachus capeneri* (see *rufescens* discussion).

MALE GENITALIA: Basic structure as in *N. sweeti*.

Only two male specimens of *N. sloggetti* are known: the holotype from Deelfontein, Cape Province, deposited in the British Museum (Natural History), and an individual from Zomerkomst, Politzi, Transvaal, 23.X.64, deposited in the South African National

Collection of Insects. A large number of species from the South African National Collection of Insects (see e.g. *Karoocapsus*) are known from Middelburg, Cape Province, and also from Zomerkomst, Politzi, Transvaal. These localities are very different floristically (Acocks, 1951), and there is some question about the accuracy of labeling. The occurrence of *N. sloggetti* in Deelfontein and Middelburg, would be more logical than in Deelfontein and Politzi because of the greater similarity of available habitats at Middelburg and Deelfontein. This situation merits further investigation to be sure that distributions within South Africa are not being interpreted incorrectly.

***Nichomachus sweeti*, new species**

Figures 5, 6, 96-99

MACROPTEROUS MALE: Body generally black or nearly so; hemelytra with white maculae on basal third of corium, on clavi at about midpoint of claval commissure, and on basal third of cuneus; posterior margin of metepisternum white; distal sixth of antennal segment 3 yellow.

MEASUREMENTS: Length 4.80, maximum width 1.36, length head .34, width head .92, interocular space .34, length pronotum .82, width pronotum 1.16, length scutellum .52, width scutellum .56, length corium 2.14, length clavus 1.40, length cuneus .66, width cuneus .54, length claval commissure .90, distance apex commissure-apex membrane 2.24, length metatibia 2.10, length antennal segments 1—.26, 2—1.10, 3—.80, 4—.60; length labial segments 1—.40, 2—.42, 3—.40, 4—.44.

MALE GENITALIA: Figures 96, 97. See generic description.

BRACHYPTEROUS FEMALE: Strongly ant-mimetic, brachypterous; black; transverse fascia at level of apex of scutellum, posterior margin of hemelytra laterally, posterior margin of metepisternum, metacoxae distally, and antennal segment 3 white.

Entire body granulose or rugulose, weakly shining, with scattered, short, decumbent, shining hairs; abdomen also with scattered, long, erect, shining hairs; scutellum with several long, erect, shining hairs; antennae, tibiae, and tarsi with decumbent shining hairs.

Head broad, concave behind, frons convex; eyes small; posterior margin of vertex slightly concave and broadly carinate; antennal segment 1 only very slightly enlarged, segment 2 tapering distally to slightly less than diameter of segment 1, segments 3 and 4 subequal in diameter, slightly greater than diameter of segment 1;

antennae inserted just below eye and mesad of eye by distance nearly equal to length of antennal segment 1; labium just surpassing metacoxae; pronotum with narrow depressed collar, anterior lobe greatly swollen, posterior lobe about one-quarter length of anterior lobe, collar-like, posterior margin straight; mesoscutum strongly inclined anteriorly; scutellum inflated, nearly conical; hemelytra undifferentiated, lateral margins nearly straight, posterior margin sinuate, posterolateral angles forming acute projections; abdomen narrow basally, greatly expanded medially, pointed apically; all femora swollen distally; metatibiae bowed.

MEASUREMENTS: Total length 4.48, maximum width 1.60, length head .32, width head 1.08, interocular space .66, length pronotum .94, width pronotum .95, length scutellum .32, width scutellum .44, length hemelytra .90, length metatibia 2.10, length antennal segments 1—.28, 2—1.00, 3—.68, 4—.62; length labial segments 1—.50, 2—.50, 3—.40, 4—.56.

FEMALE GENITALIA: Figures 98, 99. See generic description.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Schoemannspoort, 10 mi. N. of Oudtshoorn, elevation 1200 ft., 18 Nov. 1967, M. H. Sweet (SANC).

PARATYPES: *Cape Province*—3 macropterous ♂♂, 2 brachypterous ♀♀, same data as holotype; 1 macropterous ♂, Cape Peninsula, Noordhoek Beach, 23 Jan. 1968 (JAS, RTS).

This species is named for Dr. Merrill H. Sweet, of Texas A. & M. University, who collected most of the known specimens.

Nichomachus sweeti most closely resembles *N. minutus* but can be recognized by its larger size and much darker coloration.

The resemblance of the female of *N. sweeti* to species of *Crematogaster* ants from both Schoemannspoort and Noordhoek Beach is remarkable. The Noordhoek Beach specimen of *sweeti* was taken under *Helichrysum crispum* (L.) D. Don. (Compositae).

***Pseudonichomachus*, new genus**

MACROPTEROUS MALE: Ant mimetic; head, pronotum, and scutellum smooth, weakly shining; anterior two-thirds of clavus, adjacent corium, cuneus, and cell of membrane strongly shining; remainder of corium pruinose; membrane dull; dorsum with scattered, decumbent, short hairs; antennae with dense short vestiture; tibiae with scattered semierect spines about as long as tibial diameter.

Head nearly vertical, concave behind; frons weakly convex, transversely rugose, longitudinally sulcate; posterior margin of vertex with low, broad carina; eyes occupying entire sides of head;

antennae inserted just above ventral margin and very close to eyes; antennal segment 1 slightly swollen, segments 2, 3, and 4 subequal in diameter, slightly less than diameter of segment 1; labium reaching or just surpassing mesocoxae; pronotum strongly constricted just anterior to middle, with narrow depressed collar, anterior lobe about two-thirds width of head, neck-like, posterior lobe inflated, nearly hemispherical; mesoscutum inclined anteriorly; scutellum bulbous; lateral corial margin strongly sinuate, anterior half strongly reflexed ventrally; clavus raised along commissure to nearly height of scutellum; cuneal incisure obsolete; membrane with single cell; abdomen narrow, reaching almost to apex of membrane; parempodia fleshy, convergent apically, recurved; pulvilli minute.

MALE GENITALIA: Figures 93A-95. Basic structure as in *Nichomachus*.

Females unknown.

TYPE SPECIES: *Pseudonichomachus mimeticus*, new species.

This genus is named for its close relationship to *Nichomachus*.

Pseudonichomachus differs from *Nichomachus* by the former having a much longer, more neck-like, anterior pronotal lobe than the latter.

Both known species of this genus are from South Africa and are ground living.

***Pseudonichomachus capeneri*, new species**

Figure 7

MACROPTEROUS MALE: Basic coloration reddish brown; apex of clavus, anterior quarter of corium, legs, antennae, and labium weakly castaneous; cuneus deep castaneous; abdomen light basally, castaneous apically; membrane smoky gray brown; hemelytra with white transverse maculae on anterior third and posterior third of corium, on basal quarter of cuneus, and on clavus at about midpoint of claval commissure; posterior margin of all epistrena above coxae and distal margin of all trochanters white.

Head and pronotum rather strongly shining.

Vertex slightly depressed between eyes, labium reaching to middle of mesocoxae; all appendages except antennal segments 1 and 2 and mesofemora and metafemora and tibiae missing in holotype.

MEASUREMENTS: Total length 4.80, maximum width 1.24, length head .38, width head 1.00, interocular space .24, length pronotum .88 (anterior lobe .28, posterior lobe .60), width pronotum 1.24, length scutellum .78, width scutellum .78, length corium 2.00, length clavus 1.60, length cuneus .82, width cuneus .50, length

claval commissure .66, distance apex commissure-apex membrane 2.12, length metatibia 2.18, length antennal segments 1—.32, 2—.96, 3—?, 4—?; length labial segments 1—.34, 2—.34, 3—.40, 4—.44.

MALE GENITALIA: Basic structure as in *P. mimeticus*.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: Transvaal, Elandshoek II.1956, A. L. Capener (SANC).

PARATYPES: Transvaal—2 macropterous ♂♂, Zoutpansberg District, Khalarha District, 3700 ft., 23. iv. 1954, at light, very open bush and grass veld (Balfour-Browne) (BM[NH]).

This species is named for Mr. A. L. Capener of Pretoria, who has been one of the most active collectors of Miridae in South Africa over the last two decades and has therefore made available for this study a tremendous amount of invaluable material.

Pseudonichomachus capeneri can be separated from *P. mimeticus*, the only other described species in the genus, by its bright orangish to reddish brown coloration; *mimeticus* is dark brown to nearly black.

***Pseudonichomachus mimeticus*, new species**

Figures 8, 93A–95

MACROPTEROUS MALE: General coloration blackish brown; head and anterior lobe of pronotum, corium at level of claval commissure, and femora, castaneous; distal third of antennal segment 3, broad band on distal half of mesotibiae and metatibiae, transverse fascia on corium at level of apex of scutellum (just reaching onto clavus), narrow transverse marking on clavus at midpoint of claval commissure, and narrow, anteriorly inclined, transverse bands two-thirds of width of corium (reaching lateral corial margin) at apex of clavus, dull white; anterior quarter of cuneus, posterior margin of all mesepisterna above coxae, and distal margin of trochanters white; all tarsi and abdominal sternite 2 light brown.

Head, pronotum and scutellum weakly shining.

Labium just surpassing mesocoxae.

MEASUREMENTS: Total length 4.08, maximum width 1.10, length head .20, width head .82, interocular space .26, length pronotum 1.06 (anterior lobe .40, posterior lobe .66), width pronotum 1.10, length scutellum .62, width scutellum .58, length corium 1.66, length clavus 1.26, length cuneus .76, width cuneus .40, length claval commissure .60, distance apex commissure-apex membrane 1.70, length metatibia 1.86; length antennal segments 1—.26, 2—1.04,

3—.80, 4—.35; length labial segments 1—.36, 2—.32, 3—.32, 4—.38.

MALE GENITALIA: Figures 93A–95. Basic structure as in *Nichomachus*.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, top Magoebaskloof, 12 Dec. 1967, J. A. & S. Slater, T. Schuh, J. Munting (SANC).

PARATYPES: *Cape Province*—1 macropterous ♂, Cape Town (Bridwell). *Transvaal*—1 macropterous ♂, same data as holotype; 1 macropterous ♂, 22 mi. S. Barberton, 4900 ft. elevation, 24 Mar. 1968 (USNM, JAS, RTS).

This species is named for its ant-like appearance.

See discussion under *P. capeneri* for separation of species.

TRIBE ORTHOTYLINI

Cyrtorhinus Fieber

Cyrtorhinus Fieber, 1858, p. 313.

Cyrtorhinus was monographed by Carvalho and Southwood (1955). The genus presently contains six species distributed primarily in the Old World tropics with one species common to Europe and North America.

Cyrtorhinus melanops Reuter

Figures 9, 102, 103

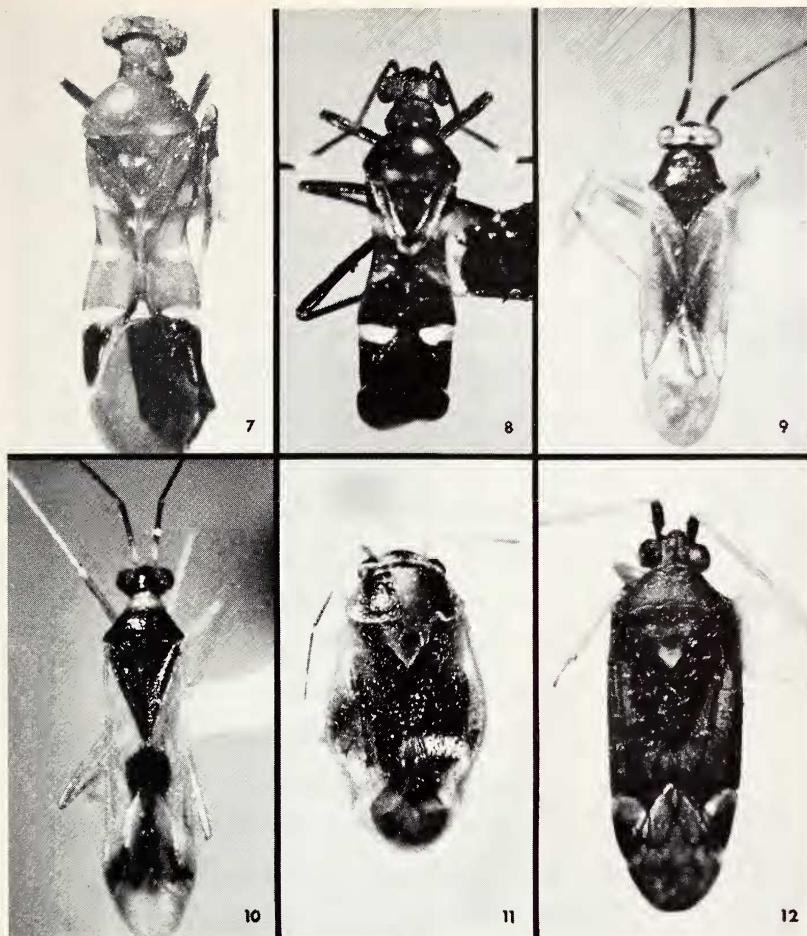
Cyrtorhinus melanops Reuter, 1905a, p. 6.—Carvalho, Dutra, and Becker, 1960, pp. 459–460, 475 (in part).

Cyrtorhinus melanops can be most easily recognized by the apically convergent, recurved parempodia, orthotyline-type male genitalia (Figs. 102, 103), the dark head, pronotum, and scutellum, the light hemelytra, and the shape of the head and body (Fig. 9).

No biological information is available for this species, but it is possible that it is primarily predatory, as is *Cyrtorhinus caricis* (Fallen) (Southwood and Leston, 1958).

Cyrtorhinus melanops is known only from Ethiopia and South Africa (Carvalho, 1958b). Carvalho et al. (1960), incorrectly recorded specimens of *Tytthus parviceps* from 10 miles north of Matatiele, Cape Province, as *C. melanops* (see also *T. parviceps*).

SPECIMENS EXAMINED: SOUTH AFRICA: *Cape Province*—1 macropterous ♂, Kokstad, 6.III.51 (Brinck and Rudebeck). *Trans-*



FIGS. 7-12. Nichomachini, Orthotylini. Fig. 7. *Pseudonichomachus capeneri*, male, holotype. Fig. 8. *Pseudonichomachus mimeticus*, male, holotype. Fig. 9. *Cyrtorhinus melanops*, male (Rustenburg, Transvaal). Fig. 10. *Felisacodes bryocorina*, male (Grootvadersbosch Forest Reserve, Cape Province). Fig. 11. *Pseudoambonea capeneri*, female, holotype. Fig. 12. *Pseudoloxops transvaalensis*, male (Messina, Transvaal).

vaal—1 macropterous ♂, Hartbeespoort Dam, 20 mi. W. Pretoria, 30 October 1967; 3 macropterous ♀♀, Little Sabie River, Sabie, 29 Nov. 1967; 1 macropterous ♀, Rustenburg, I-4-11-1957 (Capener); 2 macropterous ♂♂, Rustenburg, I-5-1957 (Capener); 1

macropterous ♂, Rietfontein, 4.12.06 (SANC, TM, LU, JAS, RTS).

Felisacodes Bergroth

Rhodesiella Poppius, 1914a, pp. 64–65 (preocc.).

Felisacodes Bergroth, 1926, p. 64 (new name).—Odhiambo, 1967, p. 1681.

Madagascariella Carvalho, 1953a, pp. 44–45. **New Synonymy.**

Odhiambo (1967) noted that until the male genitalia of *Felisacodes* were examined the correct tribal placement of the genus could not be determined. I have dissected both the male and female genitalia of *F. bryocorina* (Poppius) from South Africa. Those of the male are typical of the Orthotylini, with a membranous vesica lacking spiculi. The female has well developed K-structures which unquestionably places *Felisacodes* in the Orthotylini. *Zanchiella* is the most closely related genus.

Odhiambo (1967) examined the holotype of *Madagascariella longipides* Carvalho and noted that it and *Felisacodes* were extremely closely related, if not congeneric. I have also compared specimens of *F. bryocorina* with the holotype of *M. longipides* in the Paris Museum. The structure and coloration of the two are very similar, the most obvious difference being a more strongly rugose pronotum in *Madagascariella*. I do not believe this feature to be generically significant and therefore synonymize *Madagascariella* Carvalho with *Felisacodes* Bergroth.

List of described species of *Felisacodes*

bryocorina Poppius (*Rhodesiella*), 1914a, p. 65. Rhodesia; South Africa.

dibuora Odhiambo (*Felisacodes*), 1967, pp. 1681–1683. Cameroon.

longipides Carvalho (*Madagascariella*), 1953, pp. 44–45. Madagascar.

Felisacodes bryocorina (Poppius)

Figure 10

Rhodesiella bryocorina Poppius, 1914a, p. 65.

Felisacodes bryocorina Carvalho, Dutra, and Becker, 1960, pp. 462–463.

Felisacodes bryocorina can be distinguished from all other South African mirids by the elongate body (total length 4.12 mm., maximum width 1.04 mm.), the hyaline hemelytra, the row of punctures

on the clavus parallel to the claval commissure, and the extremely long appendages, with antennal segment 1 being longer than the width of the head. *F. bryocorina* can be separated from *F. dibuora*, the only other species of *Felisacodes* in Africa, in that *dibuora* has a light colored scutellum and *bryocorina* has a dark scutellum, which is unicolorous with the posterior lobe of the pronotum.

Three males and one female of *F. bryocorina* are in the British Museum (Natural History). I have selected a male as the lectotype. It bears the labels: "S. Rhodesia, Chirinda, 12.VI.1911, Swynner-ton" and "LECTOTYPE *Rhodesiella bryocorina* Poppius, det. R. T. Schuh."

The only host plant record for this species is *Plectranthus fruticosus* L'Hes. (Labiatae). The plants were growing in a heavily shaded forest.

SPECIMENS EXAMINED: SOUTH AFRICA: *Cape Province*—40 macropterous ♂♂, 23 macropterous ♀♀ (1 nymph in alcohol), Grootvatersbosch For. Res., 14 mi. N. Heidelberg, 5 Feb. 1968 (Adults and nymphs on *Plectranthus fruticosus* L'Hes.); 2 macropterous ♀♀, Port St. Johns, Pondoland, Sept. 1923 (Turner); 1 macropterous ♂, Storms River Mouth, 13 Feb. 1968; 1 macropterous ♂, Tsitsikama Forest, Stormsrivierpiek, 13.I.51 (Brinck and Rudebeck). *Natal*—1 macropterous ♂, Kloof, 1500 ft., Aug. 1926 (Turner) (SANC, BM[NH], TM, SAM, HM, LU, USNM, JAS, RTS).

"The *Orthotylus* complex"

Several groups of species that can be placed in *Orthotylus* Fieber or closely related genera are present in South Africa. The only comprehensive work on *Orthotylus* is that of Southwood (1953) which is restricted to the British species. This work is unfortunately of limited use outside of Europe for it does not define the genus on a world basis and the subgenera of Southwood are based only on European species. Lindberg (1951; 1953) has dealt extensively with the species of *Orthotylus* from the Canary Islands and segregated *Canariocoris* Lindberg from *Orthotylus*. Knight (1968) described several new species of *Melanotrichus* Reuter, which he considered as a distinct genus, from the western United States.

The extreme variation found in *Orthotylus* is described in part by Southwood (1953) and can be judged also by the number of generic synonyms associated with the genus (see Carvalho, 1958b). *Orthotylus* is probably cosmopolitan, although Carvalho does not record it from South America. Poppius (1914a) listed only four

species from Africa (including *Chlorosomella geniculata* Reuter). Very little has been done to advance our knowledge of *Orthotylus* in Africa since Poppius' work.

In the collections I have examined from South Africa there are approximately 20 species that can be assigned to *Orthotylus* and related genera. Several distinct groups of species exist, and the type of character variation in them is difficult to understand.

At least two species from South Africa appear to be related to the European genus *Pachylops* Fieber. The claspers of the males are modified and bizarre in one species, which has a slender, elongate labium, while the other species has much more conventional male genitalia, and a short apically thickened labium, very similar to *Pachylops* species from Europe. The coloration of these species is essentially brownish or reddish and the dorsum is polished and shining.

Two specimens very close to *Chlorosomella* (= *Orthotylus*) *geniculata* Reuter are known from Politzi, Transvaal.

A long series of light green males from light traps, primarily at Grootfontein, Middelburg, Cape Province, probably represents a single rather variable species. These specimens have the black, scale-like hairs of the subgenus *Orthotylus* (*Melanotrichus*); they also have claspers that are of a type that occurs in several species that lack the black scale-like hairs.

Two small groups of light green species, with the clasper type found in the "*Melanotrichus*" species mentioned above, can be distinguished on labial length. Eight additional species which vary in characters of the eyes, beak length, male genitalia, and general body shape have also been examined.

One of the most common "*Orthotylus*" species is velvety green and lives on *Acacia*. Two specimens appearing to be closely related to this species are known from Djab, South West Africa and are deposited in the Transvaal Museum; they have the hemelytra velvety red instead of green.

A very small species with a dark head, pronotum, and scutellum and light hemelytra is known from Malips Drif, Transvaal.

Pseudambonea, new genus

MACROPTEROUS FEMALE: Head nearly vertical, body thick-set; pronotum distinctly transversely rugose, head, scutellum, and hemelytra smooth, head with scattered, semierect, light hairs about as long as tibial diameter; remainder of dorsum with decumbent light hairs about as long as tibial diameter; antennae with short, light

hairs about as long as diameter of segment 3; antennal segment 1 with a few, erect, fine, light spines on inner surface; labium with some short, erect, light hairs; thoracic pleura glabrous; femora with some decumbent light hairs and a few very long, fine, erect hairs on ventral surfaces; tibiae and tarsi with reclining, short, light hairs and a few semierect light spines about the length of tibial diameter; abdomen with reclining light hairs about as long as tibial diameter.

Head strongly declivous, slightly wider than anterior margin of pronotum; eyes occupying about half height of head, not noticeably granular; antennae inserted at level of ventral margin of eyes; antennal segment 1 moderately enlarged, segment 2 distinctly tapering proximally, distally about three-fourths diameter of segment 1, segments 3 and 4 subequal in diameter, equal to proximal diameter of segment 2 (about three-fourths distal diameter of segment 2); clypeus large, rounded transversely, strongly curved posteroventrally; bucculae small; buccal cavity short; gula short, length about equal to diameter of antennal segment 1; pronotum only very slightly narrowed anteriorly, anterior margin finely carinate, upturned, lateral margins nearly straight; pronotum flattened, calli indistinct; entire posterior margin of pronotum slightly upturned; mesoscutum concealed beneath pronotum; scutellum very slightly elevated; hemelytra strongly convex transversely; lateral corial margins strongly and somewhat irregularly convex, hemelytra widest at level just posterior to midpoint of claval commissure; cuneal incisure deep, fracture at right angles to longitudinal axis of body; cuneus and membrane strongly declivous; membrane with two cells; femora narrow; only metatibiae with longitudinal rows of tiny closely-spaced spines; claws stout, strongly curved, thickened basally; parempodia fleshy, convergent apically, recurved; pulvilli minute.

FEMALE GENITALIA: Figure 106. Posterior wall with well developed K-structures.

MACROPTEROUS MALE: Structurally similar to female but more elongate.

MALE GENITALIA: Figures 104, 105. Vesica membranous with sclerotized spiculi.

TYPE SPECIES: *Pseudambonea capeneri*, new species.

This genus is named for its very close resemblance to *Ambonea* Odhiambo.

Pseudambonea appears superficially to be closely related to *Ambonea* in the Pilophorini. The structure of the posterior wall of the female, in particular, indicates that there is actually no close relationship between the two genera. This contention is supported

also by the structure of the male genitalia. The genus can be most easily recognized by the compact body form, the posteriorly concave, strongly declivous, broad head, the single type of pubescence, the orthotyline pretarsal structures and the type of male and female genitalia. *Ambonea* can be easily separated from *Pseudambonea* in that it has wooly pubescence as well as setiform hairs on the dorsum.

***Pseudambonea capeneri*, new species**

Figures 11, 104–106

MACROPTEROUS FEMALE: Dorsum generally light brown or tan; broad median longitudinal band on head including clypeus (excluding posterior margin of vertex), pronotum very broadly on either side of midline, and clavi (except anteriorly along suture) brown; posterior half of hemelytra and cuneus mesally more or less strongly suffused with brown or reddish brown; membrane smoky brown; antennal segment 1, proximal half of antennal segment 2, labium, and legs including procoxae cream; distal half of antennal segment 2, antennal segments 3 and 4, and all tarsal segments 3 dark brown; metafemora with broad red band distally; mesocoxae and metacoxae, thoracic pleura, and most of abdominal venter reddish brown; anterior half of abdominal segment 9 light.

Entire body highly polished and shining.

Posterior margin of vertex with distinct raised carina; antennal fossae removed from anterior margins of eyes by distance equal to distal diameter of antennal segment 2; labium reaching apex of mesocoxae; anterior pronotal margin weakly sinuate, posterior margin straight across scutellum, very broadly rounded laterally; posterior margin of membrane cells broadly rounded; abdomen just surpassing apex of cuneus; metatarsal segment 2 slightly longer than segment 1, segment 3 about 2 times length of segment 1.

MEASUREMENTS: Total length 3.36, maximum width 1.92, length head .16, width head 1.04, interocular space .60, length pronotum .64, width pronotum 1.40, length scutellum .52, width scutellum .72, length corium 1.64, length clavus 1.36, length cuneus .64, width cuneus .56, length claval commissure .72, distance apex commissure-apex membrane 1.52, length metatibia 1.48; length antennal segments 1—.32, 2—1.08, 3—.52, 4—.40; length labial segments 1—.34, 2—.32, 3—.20, 4—.24.

FEMALE GENITALIA: Figure 106.

MACROPTEROUS MALE: Appearing uniformly gray brown; coloration may be result of teneral condition of only known male specimens.

MALE GENITALIA: Figures 104, 105.

HOLOTYPE: Macropterous ♀, SOUTH AFRICA: *Cape Province*, 16 mi. north of Steytlerville, 24.X.64, A. L. Capener (SANC).

PARATYPES: 3 macropterous ♀♀, 2 macropterous ♂♂, same data as holotype (SANC, RTS).

This species is named for the collector, Mr. A. L. Capener.

As the only known species in the genus, *P. capeneri* can be recognized by the characters noted in the generic discussion.

***Pseudoloxops* Kirkaldy**

Loxops Fieber, 1858, p. 314 (preocc.).

Pseudoloxops Kirkaldy, 1905, p. 268 (new name).

Pseudoloxops Kirkaldy is widely distributed in the southern Palearctic and Old World tropics including the Southwest Pacific. It currently includes 16 described species. The genus can be recognized by the following combination of characters: body ovoid; coloration usually carmine-red and yellow-white; frons bluntly produced; antennal segment 1 and dorsum with long, shaggy pubescence; parempodia convergent apically, recurved; and male and female genitalia of the "*Orthotylus*-type". The shaggy pubescence is often badly rubbed.

Several specimens probably representing three new species of *Pseudoloxops*, in addition to the species described below, are known from South Africa. They are: a male from Satara Camp, Kruger National Park, deposited in the J. A. Slater Collection; a female from Malelane, Transvaal, deposited in the Transvaal Museum, probably the same species as the Satara specimen; a female from Port St. Johns, Cape Province, deposited in the British Museum (Natural History), probably closely related to the above specimens, and a female from Keiskama Hoek, King Williams Town District, Cape Province, deposited in the South African National Collection of Insects, distinct from all of the above specimens.

***Pseudoloxops transvaalensis*, new species**

Figures 12, 107, 108

MACROPTEROUS MALE: Red as follows—pronotum, mesoscutum, clavus, corium, apical half of cuneus, veins of membrane, midline of frons, vertex very narrowly, juga, antennal segment one, thoracic pleura, distal two-thirds of metafemora, and venter of abdomen laterally; vertex, frons, scutellum (heavily suffused with red medially), antennal segment 2 (segments 3 and 4 missing from

holotype), thoracic sternum, all coxae, profemora and mesofemora entirely, metafemora proximally, all tibiae, all tarsi, and abdominal venter, irregularly, cream; basal half of cuneus orange.

Entire body surface smooth, dull; dorsum with moderately dense, semierect, woolly hairs about as long as $1\frac{1}{2}$ times diameter of antennal segment 2; pronotum, scutellum, clavus, and corium with some decumbent, flattened, sericeous hairs (in patches on clavus and corium); antennal segment 1 with many long, shaggy, dark hairs as on dorsum, segment 2 with very short, decumbent, light pubescence; labium with some erect, short, light hairs; femora with reclining hairs and a few long, fine, erect hairs on ventral surfaces; tibiae with only very sparse, fine, reclining light hairs and a few semierect light spines slightly longer than tibial diameter; thoracic pleuron glabrous; abdominal venter with long, reclining, light hairs.

Eyes very large, strongly protuberant, occupying nearly entire sides of head as viewed from above, vertex flat, nearly horizontal, posterior margin poorly defined, ecarinate; frons transversely rugose, produced into broad, blunt, rounded projection occupying entire space between antennal bases as viewed from above; anterior margins of eyes strongly sinuate; antennae inserted at middle of anterior margins of eyes, fossae contiguous with eyes; antennal segment 1 distinctly enlarged, somewhat swollen medially, segment 2 cylindrical, slightly more than half diameter of segment 1; bucculae only slightly expanded; buccal cavity reaching prosternum; labium reaching to trochanteral joint of mesocoxae; pronotum with anterior margin finely carinate, upturned, sinuate, lateral margins nearly straight, distinctly convergent anteriorly, posterior margin excavated across mesoscutum; calli obscure, with shallow longitudinal depression between them; mesoscutum broadly exposed, about half length of flat scutellum; lateral corial margins straight, parallel; cuneal incisure obsolete, fracture at right angles to corial margin; metatibiae only with longitudinal rows of tiny closely spaced spines; metatarsal segments 1 and 2 subequal in length, segment 3 slightly longer than segment 2; claws strongly curved, broad basally; parempodia fleshy, convergent apically, recurved; pulvilli minute.

MEASUREMENTS: Total length 3.68, maximum width 1.44, length head .36, width head .84, interocular space .32, length pronotum .44, width pronotum 1.24, length scutellum .64, width scutellum .92, length corium 1.84, length clavus 1.44, length cuneus .60, width cuneus .30, length claval commissure .84, distance apex commissure-apex membrane 1.44, length metatibia 1.96, length antennal segments 1—.48, 2—.80, 3—.28, 4—.32.

MALE GENITALIA: Figures 107, 108. Vesica membranous with sclerotized spiculi.

MACROPTEROUS FEMALE: Similar to male but with the eyes smaller and vertex relatively wider; pronotum more flattened than in male, posterior margin not excavated; lateral corial margins slightly convexly rounded.

FEMALE GENITALIA: Posterior wall with well developed K-structures.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Claudiushoop, 11 mi. N. Dendron, 15.12.65, M. Johannsmeier (SANC).

PARATYPES: *Transvaal*—1 macropterous ♂, Messina, XII-30-I-2-1957 (Capener); 1 submacropterous ♀, Punda Milia, KNP., 16.I.65 (Hoffman) (SANC, RTS).

ADDITIONAL SPECIMENS: *South West Africa*—1 macropterous ♀, Abachaus, IX. 1946 (Hobohm) (TM).

This species is named for its occurrence in the Transvaal.

P. transvaalensis is characterized by long wooly pubescence, a bluntly produced frons, deep red coloration with the basal half of the cuneus orange, and the structure of the male genitalia. The specimen from Abachaus, South West Africa, is in very poor condition and therefore has not been included in the paratype series.

Nothing is known of the biology of this species.

***Pseudopilophorus*, new genus**

MACROPTEROUS FEMALE: Elongate, ant mimetic; entire body smooth, dull; pronotum indistinctly transversely rugose; body with moderately dense, sericeous, decumbent pubescence; antennae with very fine, short, semiappressed vestiture; femora and tibiae with decumbent hairs.

Head vertical, elongate dorsoventrally, frons and gula nearly parallel; eyes large, somewhat reniform in lateral view, contiguous with anterior margin of pronotum; posterior margin of vertex carinate, slightly arched above dorsal margin of eyes; vertex depressed just anterior to posterior margin; frons nearly flat; antennae inserted just above ventral margin of eyes; antennal segment 1 only slightly enlarged, segment 2 tapering proximally, distal diameter about equal to diameter of segment 1, segment 3 about equal to proximal diameter of segment 2, segment 4 of slightly smaller diameter than segment 3; clypeus large; labrum compressed laterally; gula about length of antennal segment 1; buccal cavity large, elongate oval; labium very short; pronotum campanulate, flat, somewhat

inclined posteriorly; mesoscutum exposed, flattened; scutellum convex; hemelytra with lateral margins strongly sinuate, narrowest at about middle of corium; clavi elevated along commissure; cuneal fracture angled anteromedially; membrane with 2 cells; profemora and tibiae of conventional structure; mesofemora slightly larger proximally than distally; mesotibiae flattened laterally, tapered, greatest width about one-third distance from femoral joint; meta-femora and tibiae similar in structure to mesolegs but much longer and conspicuously bowed; mesotibiae and metatibiae with longitudinal rows of tiny closely spaced spines; parempodia fleshy, apically convergent, recurved; pulvilli minute; abdomen strongly constricted basally.

FEMALE GENITALIA: Figures 109, 112. Posterior wall with well developed K-structures; sclerotized rings with lateral margins strongly infolded.

MACROPTEROUS MALE: Very similar to female.

MALE GENITALIA: Figures 110, 111. Vesica membranous with long sclerotized spiculum.

TYPE SPECIES: *Pseudopilophorus capeneri*, new species.

This genus is named for its resemblance to *Pilophorus*.

Pseudopilophorus superficially resembles *Pilophorus*; however, the structure of the male and female genitalia place it in the Orthotylini, rather than in the Pilophorini. This is the only ant-mimetic genus in the Orthotylini known to occur in Africa and it is not obviously related to any other described genus. *Pseudopilophorus* can be recognized by its ant-mimic appearance, coloration pattern, convergent recurved parempodia, and male and female genital structures.

***Pseudopilophorus capeneri*, new species**

Figures 13, 109–112

MACROPTEROUS FEMALE: Posterior two-thirds of pronotum, scutellum (except as noted below), thoracic pleura and venter, and abdomen slate gray; head, anterior half of pronotum, protibiae on dorsal and ventral surfaces, antennal segment 3, distal half of antennal segment 4, labial segments 1 and 2, labrum, and dorsal stripe on profemora orangish to mahogany; proximal half of antennal segment 4, labial segments 3 and 4, procoxae, profemora, lateral surfaces of protibiae, mesotibiae distally, all tarsi, metacoxae, oval maculae covering most of posterior half of scutellum and most of cunei cream to light yellow; remainder of legs castaneous to black; corium and clavus generally gray brown; membrane and posteromesial por-

tion of cuneus smoky gray; much of body surface with dull whitish bloom.

Mesial margins of eyes straight, diverging only slightly ventrally in anterior view; antennal fossae nearly contiguous with eyes; labium just attaining middle of mesosternum; anterior margin of pronotum straight, posterior margin sinuate, concave across mesoscutum; abdomen not quite attaining apex of membrane; posterior margin of large membrane cell broadly rounded; metatarsal segments subequal in length.

MEASUREMENTS: Total length 4.96, maximum width 1.44, length head .20, width head 1.04, interocular space .48, length pronotum .84, width pronotum 1.32, length scutellum .96, length corium 2.44, length clavus 1.92, length cuneus .92, width cuneus .52, length claval commissure 1.12, distance apex commissure-apex membrane 1.96, length metatibia 4.20; length antennal segments 1—.32, 2—1.76, 3—1.28, 4—.72; length labial segments 1—.30, 2—.32, 3—.28, 4—.32.

FEMALE GENITALIA: Figures 109, 112.

MALE GENITALIA: Figures 110, 111.

HOLOTYPE: Macropterous ♀, SOUTH AFRICA: *Transvaal*, Tzaneen, 11–16 Dec. 1963, A. L. Capener (SANC).

PARATYPES: Macropterous ♂, 10 macropterous ♀♀, same data as holotype (1 specimen—host plant *Terminalia sericea*). SWAZILAND—Eranchi, XII-15-31-1954 (Capener) (SANC, JAS, RTS).

This species is named for Mr. A. L. Capener.

As the only species in the genus, *P. capeneri* can be recognized by the characters noted in the generic discussion.

This species has been taken on *Terminalia sericea* Burch. (Combretaceae), but no other biological information is available.

Zanchiella, new genus

MACROPTEROUS MALE: Small, elongate, elliptical, or nearly parallel sided; head, pronotum, and scutellum smooth; pronotum weakly transversely rugulose; hemelytra hyaline or subhyaline; dorsum with shining or dull, moderately long, semierect hairs; head broad, narrowed behind eyes; eyes large, granular, with or without short hairs; vertex weakly convex; antennae inserted slightly below middle of anterior margin of eyes which are more or less emarginate; antennal segment 1 slightly enlarged distally, segment 2 of slightly smaller diameter than segment 1, segments 3 and 4 subequal in diameter, about two-thirds diameter of segment 2; bucculae weakly

developed; gula short; labium long; pronotum with very narrow collar; calli low, indistinct; lateral margins of pronotum slightly concave; mesoscutum narrowly exposed, separated from scutellum by distinct, deep, transverse impression; scutellum usually broadly convexly elevated; lateral margins of hemelytra usually broadly convexly rounded; cuneal incisure very shallow, fracture slightly angled anteromedially; clavus with row of very fine punctures adjacent to scutellum and commissure and also row of punctures parallel to claval suture; two cells in membrane, inner vein nearly parallel to inner margin of clavus; abdomen reaching approximately to base of membrane; metatibiae with several longitudinal rows of tiny, closely-spaced spines; all tibiae with a few scattered, light, reclining spines about length of tibial diameter; tarsal claws strongly curved; parempodia fleshy, apically convergent, recurved; pulvilli minute.

MALE GENITALIA: Vesica membranous, without spiculi.

MACROPTEROUS FEMALE: Structurally similar to macropterous male; eyes slightly smaller and vertex correspondingly wider in female than in male.

FEMALE GENITALIA: Posterior wall with well developed K-structures.

TYPE SPECIES: *Zanchiella bowkeriae*, new species.

This genus is named for its close resemblance to *Zanchius* Distant.

Zanchiella can be recognized by the generally hyaline hemelytra with a row of punctures along the claval suture (see however *Z. ericae*) and the relatively short appendages. It is most closely related to *Felisacodes* and *Zanchius* in Africa.. The row of punctures on the clavus, the shape of the head, and the hyaline hemelytra, ally *Zanchiella* to *Felisacodes*; the general body form, particularly the structure of the hemelytra, and the type of vestiture, relate *Zanchiella* to *Zanchius*. The convergent recurved parempodia, the membranous vesica in the male, and the posterior wall with well developed K-structures in the female support the placement of *Zanchiella* in the Orthotylini.

KEY TO SPECIES OF *Zanchiella*

1. Basic coloration greenish (some specimens yellowish), cuneus red, contrasting with remainder of hemelytra; hemelytra not hyaline *ericae* (Fig. 16)
Basic coloration sometimes greenish, but cuneus and remainder of hemelytra never contrastingly colored; hemelytra hyaline or subhyaline 2

2. Clavus dark brown except for narrow light area along lateral margin; frons, clypeus, and pronotum partially red; veins of membrane cells dull red *capensis* (Fig. 15)
Clavus entirely light or with dark marking only on posterior third and along mesial margin; frons, clypeus, pronotum, and veins of membrane not red 3
3. Anterior third of pronotum tan, posterior two-thirds very dark brown to black; posterior third of clavus suffused with dark brown *natalensis* (Fig. 17)
Pronotum and clavus nearly unicolorous light yellow or green 4
4. Basic coloration light yellow; hemelytra with distinct brown fascia between apex of claval commissure and base of membrane *bowkeriae* (Fig. 14)
Basic coloration of hemelytra light greenish; head, pronotum, and scutellum light brownish; transverse fascia on hemelytra obsolete or very faint *sweeti* (Fig. 18)

***Zanchiella bowkeriae*, new species**

Figure 14

MACROPTEROUS MALE: Head, pronotum, scutellum, hemelytra, thoracic venter, and legs very light yellowish with darker markings as noted below; pronotum lateroventrally and posterolaterally and scutellum anterolaterally suffused with brown; corium with irregular brown transverse macula between apex of clavus and base of membrane; inner margin of costal vein and lateral margin of cuneus obscurely suffused with green; eyes black; antennal segment 1 and distal third of segment 2 dark brown, proximal two-thirds of segment 2 light brown or yellow, distal half of segment 2 with broad reddish band; antennal segments 3 and 4 light brown; membrane smoky brown, veins slightly darker; abdomen very light green to nearly white.

Hemelytra hyaline, weakly shining.

Frons slightly produced between eyes; anterior margin of eyes conspicuously emarginate at antennal bases; labium just attaining distal end of metacoxae; punctures on clavus small but distinct.

MEASUREMENTS: Total length 4.52, maximum width 1.34, length head .30, width head .66, interocular space .24, length pronotum .52, width pronotum 1.02, length scutellum .46, width scutellum .62, length corium 1.98, length clavus 1.30, length cuneus .81, width cuneus .40, length claval commissure .72, distance apex commissure-apex membrane 2.00, length metatibia 2.20; length antennal segments 1—.42, 2—1.50, 3—.82, 4—approx. .74; length labial segments 1—.28, 2—.30, 3—.40, 4—.38.

MALE GENITALIA: Not illustrated. See generic discussion.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, 22 mi. S. Barberton, 4900 ft. elevation, 24 Mar. 1968, T. Schuh, J. A. & S. Slater, M. Sweet (Adults on *Bowkeria cymosum* McOwan) (SANC).

PARATYPES: 4 macropterous ♂♂, 3 macropterous ♀♀, same data as holotype (SANC, JAS, RTS).

This species is named for the host plant genus *Bowkeria*.

Zanchiella bowkeriae is most closely related to *Z. capensis* and *Z. natalensis*. It can be most easily recognized by the light colored pronotum in combination with the conspicuous dark fascia on the posterior half of the corium.

This species is known only from the type locality on *Bowkeria cymosum* McOwan (Scrophulariaceae). The host genus is endemic to South Africa (Phillips, 1951).

***Zanchiella capensis*, new species**

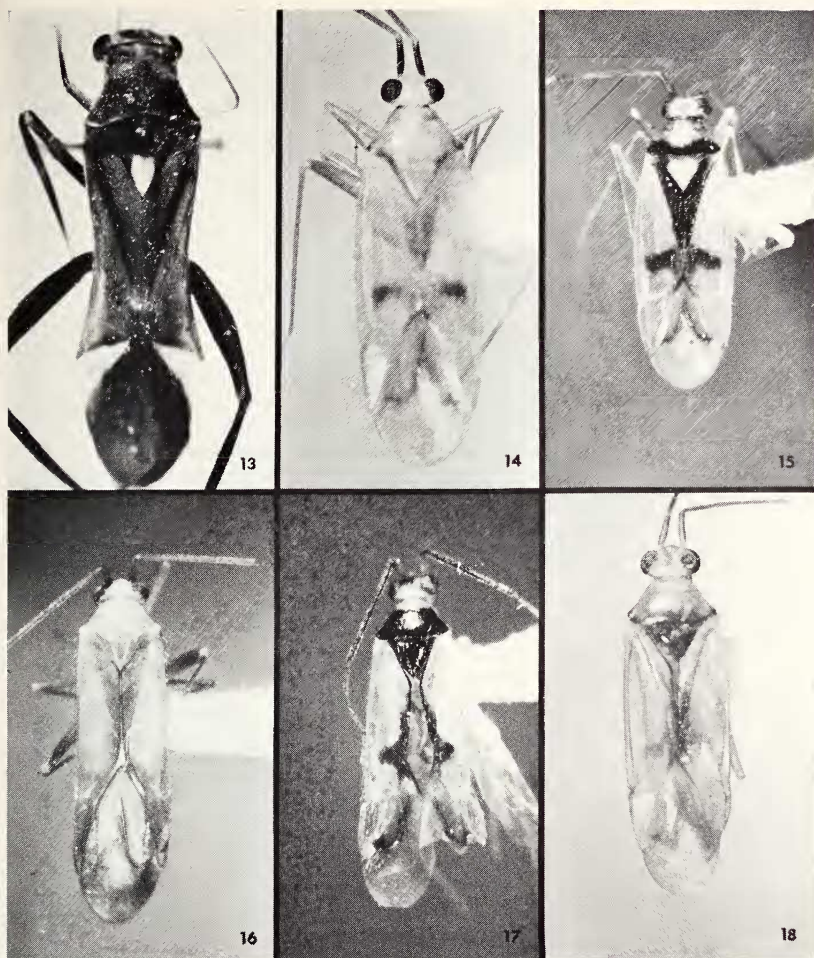
Figure 15

MACROPTEROUS MALE: Basic coloration very light yellowish; frons, clypeus, basal third of antennal segment 1, pronotum dorsally (except for a rounded, light, central marking and the posterior quarter), mesoscutum, and extreme apex of cuneus, bright red; remainder of antennae brown; eyes black; pronotum on pleural region and posterior quarter dorsally dark brown; clavus mesiad of row of punctures along claval suture dark brown; transverse macula on corium between apex of cuneus and base of membrane, and veins of membrane dull red brown; thoracic pleuron light reddish brown (except as above); abdomen lateroventrally and genital segments red, remainder white.

Pronotum very obscurely rugulose, polished, shining; hemelytra hyaline, weakly shining.

Frons slightly convexly produced between eyes; eyes weakly emarginate at antennal bases; labium just surpassing apex of mesocoxae.

MEASUREMENTS: Total length 3.20, maximum width 1.12, length head .26, width head .58, interocular space .26, length pronotum .44, width pronotum .84, length scutellum .40, width scutellum .58, length corium 1.64, length clavus 1.10, length cuneus .66, width cuneus .30, length claval commissure .64, distance apex commissure-apex membrane 1.44, length metatibia 1.86; length antennal segments 1—.32, 2—1.16, 3—.66, 4—.60; length labial segments 1—.30, 2—.30, 3—.42, 4—.40.



FIGS. 13-18. Orthotylini. Fig. 13. *Pseudopilophorus capeneri*, male, holotype. Fig. 14. *Zanchiella bowkeriae*, male, holotype. Fig. 15. *Zanchiella capensis*, male, holotype. Fig. 16. *Zanchiella ericae*, male (Giants Castle, Natal). Fig. 17. *Zanchiella natalensis*, male, holotype. Fig. 18. *Zanchiella sweeti*, female (Fountains, Pretoria, Transvaal).

MALE GENITALIA: Not illustrated. See generic discussion.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: Cape Province, Ysterhoutrug Picnic Site, 18 mi. NE Knysna, 10 Feb. 1968, T. Schuh, J. A. & S. Slater, M. Sweet (SANC).

PARATYPES: *Cape Province*—1 macropterous ♂, same data as holotype; 1 macropterous ♀, Storms River Mouth, 14-15.X.1964 (Capener) (SANC, RTS).

This species is named for its occurrence in the Cape Province.

Zanchiella capensis is most closely related to *Z. natalensis* and *Z. bowkeriae* but can be separated from them by the characters noted in the above key.

No host or biological information is available for this species.

***Zanchiella ericae*, new species**

Figure 16

MACROPTEROUS MALE: Basic coloration greenish with strong yellow tinge, or nearly all yellow; cuneus red; membrane light smoky gray, veins slightly reddish; antennae and legs light brownish, antennal segments 3 and 4 and all tarsal segments slightly darker than remainder of appendages; labial segments 1 and 2 greenish yellow, segments 3 and 4 brown; eyes dark brown.

Dorsum generally smooth and very finely granulose, weakly shining; hemelytra subhyaline; dorsum with scattered, fine, erect or semierect, moderately long, light brown hairs; antennae with a fine erect spine on interior surface of segment 1; eyes glabrous.

Frons rather prominently convexly rounded between eyes, clypeus visible from above; anterior margins of eyes only weakly concave, not noticeably emarginate; labium slightly surpassing metacoxae; pronotal collar extremely narrow; anterior margin of pronotum weakly sinuate; posterior margin of pronotum broadly excavated across scutellum; row of punctures on clavus obsolete; tibial spines semierect.

MEASUREMENTS: Total length 3.92, maximum width .92, length head .30, width head .60, width vertex .26, length pronotum .30, width pronotum .76, length scutellum .50, width scutellum .62, length corium 1.96, length clavus 1.28, length cuneus .84, width cuneus .30, length claval commissure .76, distance apex commissure-apex membrane 2.00, length metatibia 2.06; length antennal segments 1—.38, 2—1.44, 3—.98, 4—.54; length labial segments 1—.34, 2—.34, 3—.36, 4—.34.

MALE GENITALIA: Not illustrated. See generic discussion.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Natal*, Giants Castle Park, 5800 ft. elevation, 6 Mar. 1968, T. Schuh, J. A. & S. Slater, M. Sweet (Adults and nymphs on *Erica leucopelta* Tausch.) (SANC).

PARATYPES: 5 macropterous ♂♂, 6 macropterous ♀♀, same data as holotype (SANC, JAS, RTS).

ADDITIONAL SPECIMENS: *Cape Province*—3 macropterous ♀♀, Bainskloof Pass Summit, 21 Jan. 1968; 2 macropterous ♂♂, 3 macropterous ♀♀, Fernkloof Nat. Res., Hermanus, 3 Feb. 1968; 1 macropterous ♀, 2 mi. S. Goukamma, Knysna, 8 Feb. 1968; 1 macropterous ♂, 1 macropterous ♀, Hermanus, 1 Feb. 1968; 4 macropterous ♂♂, 15 macropterous ♀♀ (in alcohol—1 ♂, 2 ♀♀, 4 nymphs), just W. of Knysna, 8 Feb. 1968 (Adults and nymphs on *Erica floribunda* Lodd.); 1 macropterous ♂, 1 macropterous ♀, 6 mi. E. Plettenburg Bay, elevation 500 ft., 12–13 Feb. 1968; 2 macropterous ♂♂, 4 macropterous ♀♀ (in alcohol—1 ♂), Ysterhoutrug Picnic Site, 18 mi. NE Knysna, 10 Feb. 1968 (Adults and nymphs on *Erica* sp.). *Natal*—9 ♂♂, 12 ♀♀ (6 nymphs in alcohol), same data as holotype; 1 macropterous ♂, 1 macropterous ♀, Sani Pass, 6200 ft., 10 Mar. 1968 (Adults and nymphs on *Erica leucopelta* Tausch.). *Orange Free State*—7 macropterous ♂♂, 2 macropterous ♀♀, Golden Gate, 12.X.66 (Capener) (Host plant—*Erica maesta*). *Transvaal*—6 macropterous ♀♀ (in alcohol—1 ♂, 1 nymph), 22 mi. S. Barberton, 4900 ft. elevation, 24 Mar. 1968 (Adults and nymphs on *Erica drakensbergensis* Guth. & Bol.) (SANC, HM, BM[NH], JAS, RTS).

This species is named for the host plant genus, *Erica*.

I am placing this species in *Zanchiella* with some reservations. The other four species of the genus are very closely related based on the presence of claval punctures (obscure in *sweeti* and absent in *ericae*), the general body shape (much less oval in *sweeti* and *ericae* than in the other species), and the coloration pattern. *Zanchiella ericae* is isolated within the genus, but it seems unwise at the present time to erect a new genus for the reception of this species until the taxonomy of *Zanchiella* and related genera is better understood.

The variation in coloration and relative proportions between specimens from different localities is in many cases extreme, and if an adequate series were not available many specimens would almost certainly be considered as representing distinct species. The most obvious variation is in the ratio of the total length to maximum width, the ratio of length to width of the cuneus, and the ratio of total width of the head to the interocular space. The Giants Castle specimens have a very elongate aspect with a long narrow cuneus and rather large eyes and a narrow vertex. Specimens from Fernkloof Nature Reserve, Hermanus, are at the opposite extreme in all

of these characters. Specimens from other localities show intermediate conditions, but there is no obvious geographical pattern to the variation. Most specimens are light green with some yellowish suffusion, but others are almost totally yellow. Because of this variation I have designated only those specimens from the type locality as paratypes. The structure of the male genitalia of all specimens examined is very similar.

Z. ericae is apparently restricted to the genus *Erica* (Ericaceae), and seems to occur in nearly all regions of South Africa where *Erica* is present. Known host species include *E. floribunda* Lodd., *E. maesta*, *E. leucopelta* Tausch., and *E. drakensbergensis* Guth. and Bol.

***Zanchiella natalensis*, new species**

Figure 17

MACROPTEROUS MALE: Anterior portion of vertex and frons including clypeus brown; posterior half of vertex, head below eyes, and anterior third of pronotum very light brown; posterior two-thirds of pronotum and entire scutellum very dark brown; hemelytra hyaline, nearly transparent; clavus along scutellum and commissure very dark brown; posterior third of clavus and macula on corium between apex of clavus and base of membrane brown; membrane, particularly veins, smoky brown; mesial margin of costal vein and lateral margin of clavus suffused with green; antennae dark brown; labium white; thoracic pleura generally brown; coxae and legs very light brown or yellowish; base of abdomen and genital segment dark brown; remainder of abdomen light greenish.

Pronotum and scutellum polished, shining, with transverse rugosities.

Head very weakly produced between eyes; anterior margins of eyes weakly emarginate; labium just surpassing apex of metacoxae.

MEASUREMENTS: Total length 3.64, maximum width 1.08, length head .28, width head .62, interocular space .20, length pronotum .44, width pronotum .84, length scutellum .42, width scutellum .52, length corium 1.68, length clavus 1.28, length cuneus .66, width cuneus .30, length claval commissure .66, distance apex commissure-apex membrane 1.74, length metatibia 1.94; length antennal segments 1—.40, 2—1.24, 3—.81, 4—.79; length labial segments 1—.26, 2—.30, 3—.58, 4—.20.

MALE GENITALIA: Not illustrated. See generic discussion.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: Natal, Olivier-

shoek Pass Summit, 5400 ft. elevation, 25 mi. S. Harrismith, 4 Mar. 1968, T. Schuh, J. A. & S. Slater, M. Sweet (SANC).

PARATYPES: *Natal*—1 macropterous ♂, Cathedral Peak, Jan. 1964 (Capener); 1 macropterous ♂ (?), Drakensberg, 1-22.I.1927 (Turner); 1 macropterous ♂, same data as holotype. *Transvaal*—1 macropterous ♀, Wylies Poort, 10.2.41 (Capener) (SANC, BM [NH], RTS).

This species is named for its occurrence in Natal.

Zanchiella natalensis is most closely related to *Z. capensis* and *Z. bowkeriae*. It can be recognized by the pronotum being light on the anterior third and dark on the posterior two-thirds, in combination with the dark transverse macula on the posterior half of the corium.

***Zanchiella sweeti*, new species**

Figure 18

MACROPTEROUS MALE: Elongate, nearly parallel sided; head (excepting posterior margin of vertex and genae), pronotum, scutellum, clavus along posterior two-thirds of commissure, and transverse macula on corium at level of base of membrane orangish brown; genae, posterior half of vertex, hemelytra (excluding membrane), thoracic venter, legs, and labium very light green; abdominal venter green; proximal fifth of antennal segment 1 light green, distal four-fifths red; antennal segment 2 brown on proximal end, remainder with broad reddish brown bands alternating with light coloration; antennal segments 3 and 4 brown; membrane light smoky gray.

Head polished, smooth, and shining; pronotum and scutellum obscurely transversely rugulose, weakly shining; hemelytra subhyaline, dull; membrane rugulose; dorsum with semierect, moderately long, light hairs; anterolateral angles of pronotum with single, long, erect, fine seta; antennae with short, decumbent, light vestiture; abdomen with moderately long, reclining, light hairs.

Frons weakly convexly produced between eyes; anterior margins of eyes weakly emarginate; labium just surpassing metacoxae; calli rather widely separated, demarcated posteriorly by weak furrow; posterior pronotal margin very slightly convex; punctures on clavus faint; tibiae with scattered, very fine, short, reclining light spines, hardly distinguishable from light tibial hairs; metatarsal segment 1 about half length of segment 2; segments 2 and 3 subequal in length.

MEASUREMENTS: Total length 3.24, maximum width .98, length

head .28, width head .60, interocular space .20, length pronotum .42, width pronotum .78, length scutellum .34, width scutellum .46, length corium 1.58, length clavus 1.04, length cuneus .58, width cuneus .30, length claval commissure .60, distance apex commissure-apex membrane 1.52, length metatibia 1.80; length antennal segments 1—.38, 2—1.14, 3—.74, 4—.64; length labial segments 1—.30, 2—.28, 3—.38, 4—.34.

MALE GENITALIA: Not illustrated. See generic discussion.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Pretoria, Fountains, 15 December 1967, M. Sweet, at light (SANC).

PARATYPES: *Transvaal*—11 macropterous ♂♂, 8 macropterous ♀♀, same data as holotype; 2 macropterous ♀♀, Pretoria, Springbok Park, Jan. 1966 (Paliatseas) (SANC, BM[NH], JAS, RTS).

This species is named for the collector, Dr. Merrill H. Sweet.

Zanchiella sweeti can be recognized by the basic greenish coloration of the hemelytra and the inconspicuous transverse macula on the posterior half of the corium.

Zanchius Distant

Zanchius Distant, 1904c, p. 477.—Carvalho, 1956b, p. 66.

Zanchius can be characterized as follows—

MACROPTEROUS MALE: Body flattened, structure delicate; coloration light; dorsal vestiture of moderately long, semierect, light hairs; head usually flattened and quadrate (or somewhat broader than long); eyes conspicuously set forward, small, granular, protuberant, with short hairs present in some species; vertex flat or nearly so; frons convex, clypeus not or only barely visible from above; antennae inserted just above ventral margin of eyes, fossae nearly contiguous with eyes; antennal segment 1 long, cylindrical, moderately enlarged; antennal segment 2 slightly smaller in diameter than segment 1, segments 3 and 4 subequal in diameter, of slightly smaller diameter than segment 2; labium surpassing mesocoxae; calli distinct, set off by a transverse impression posteriorly; mesoscutum broadly exposed; scutellum nearly flat; hemelytra hyaline or subhyaline, very long; abdomen reaching at most to cuneal incisure; membrane with 2 cells; legs long and slender; tibiae with a few very thin, light colored spines about length of tibial diameter; metatibiae with several longitudinal rows of tiny closely spaced spines; metatarsal segment 1 shorter than segments 2 and 3; claws curved; parempodia fleshy, apically convergent, recurved; pulvilli minute.

MALE GENITALIA: Vesica membranous, without spiculi, of the Orthotylini-type.

MACROPTEROUS FEMALE: Very similar to macropterous male.

FEMALE GENITALIA: Posterior wall with well developed K-structures.

Zanchius is most closely related to *Zanchiella* in South Africa. The absence of the row of punctures paralleling the claval suture, the flattened head, and the absence of hemelytral maculae in *Zanchius* will help to separate it from *Zanchiella* in which there is a distinct row of punctures on the clavus, the head is somewhat globose, and the hemelytra usually have a contrasting dark macula. The structure of the parempodia and male and female genitalia support placement of *Zanchius* in the Orthotylini.

Distant (1904c) described *Zanchius* from India. The known range of the genus now includes the Southern Palearctic, South Africa, Southeast Asia, and the islands of the Southwest Pacific. Twelve species are currently placed in the genus, including those described as new below.

Three female specimens from Roodeplaat, Transvaal, deposited in the South African National Collection of Insects, probably represent a fifth new species in addition to those described as new in this paper. They differ from the other South African species of the genus in being somewhat smaller and generally orangish in coloration rather than green or white. Also available are several male and female specimens of what appears to be a new species of *Zanchius*; they are much smaller than any of the species of *Zanchius* described below and have the eyes only slightly set forward on the head, but agree closely with *Zanchius* in nearly all other characteristics. These specimens are deposited in the South African National Collection of Insects and the J. A. Slater Collection.

KEY TO SOUTH AFRICAN SPECIES OF *Zanchius*

1. Antennal segment 1 with a black stripe on lateral surface; antennal segment 2 black proximally; general coloration light green or yellow-green *nigrolineatus* (Fig. 22)
 Antennal segment 1 without black stripe; coloration either very light greenish or white 2
2. Basic coloration white, hemelytra usually faintly suffused with light green; pronotum and hemelytra with elongate, longitudinal, yellow-orange markings *buddleiae* (Fig. 20)
 Basic coloration either white or very light green or greenish yellow without yellow-orange markings 3
3. Basic coloration dull white; large species, length 4.40 mm.; head

broad, ratio width across eyes to median length 37:14 *alba* (Fig. 19)

Basic coloration very light green to nearly white; smaller species than above, length 3.48 mm.; head quadrate, ratio width across eyes to median length 2:1 *leucosideae* (Fig. 21)

***Zanchius alba*, new species**

Figure 19

MACROPTEROUS MALE: Entire body and appendages dull white or cream; hemelytra translucent but not hyaline, with only weak, scattered pigmentation; appendages and labium infusate apically.

Body surface smooth, dull; dorsum with rather long (about length of diameter of antennal segment 1), scattered, semierect, light hairs; antennae with short, fine, decumbent pubescence; venter of abdomen with rather dense, semidecumbent, light hairs; femora with semidecumbent, light hairs (about length of tibial diameter); tibiae with short, decumbent, light hairs and a few very light, fine, semierect spines about length of tibial diameter.

Head short, much broader than long, vertical; eyes protuberant, noticeably granular, with some very short hairs; head constricted behind eyes; vertex nearly flat; frons weakly convex, not produced beyond anterior margin of eyes as viewed from above; clypeus not visible from above; antennae inserted just above ventral margin of eyes; antennal segment 1 moderately enlarged, nearly cylindrical, segment 2 about three-fourths diameter of segment 1, segments 3 and 4 subequal in diameter, about three-fourths diameter of segment 2; head in frontal view triangular below eyes; bucculae small; labium just surpassing metacoxae; pronotum with anterior lobe somewhat swollen, demarcated by distinct transverse impression behind calli, anterolateral angles sharply rounded, anterior margin weakly sinuate, posterior lobe flattened, posterior margin shallowly excavated; mesoscutum about one-half length of scutellum; transverse impression separating scutellum and mesoscutum sinuate; scutellum weakly convex; lateral margins of hemelytra weakly convex, cuneal incisure shallow but distinct; fracture angled slightly anteromedially; metatarsal segment 1 half length of segment 3, segment 3 slightly shorter than segment 2.

MEASUREMENTS: Total length 4.40, maximum width 1.20, length head .28, width head .74, interocular space .36, length pronotum .36, width pronotum .82, length scutellum .48, width scutellum .74, length corium 2.24, length clavus 1.38, length cuneus .84, width cuneus .34, length claval commissure .68, distance apex

commissure-apex membrane 1.90, length metatibia 2.30; length antennal segments 1—.48, 2—1.50, 3—1.00, 4—.34; length labial segments 1—.32, 2—.38, 3—.34, 4—.40.

MALE GENITALIA: Not illustrated. See generic discussion.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: Natal, Olivier-shoek Pass Summit, 5400 ft. elevation, 25 mi. S. Harrismith, 4 March 1968, T. Schuh, J. A. & S. Slater, M. Sweet (Adults and nymphs on *Buddleia salviifolia* [L.] Lam.) (SANC).

PARATYPES: Natal—2 macropterous ♂♂, 6 macropterous ♀♀, Cathedral Peak, Jan. 1964 (Capener); 1 macropterous ♂, 1 macropterous ♀, Giants Castle Park, 5800 ft. elevation, 6 Mar. 1968 (Adults and nymphs on *Buddleia salviifolia* [L.] Lam.); 14 macropterous ♂♂, 27 macropterous ♀♀, same data as holotype; 1 macropterous ♂, 9 macropterous ♀♀, Sani Pass, 6200 ft., 10 Mar. 1968 (SANC, TM, BM[NH], USNM, JAS, RTS).

ADDITIONAL SPECIMENS: Natal—7 macropterous ♂♂, 5 macropterous ♀♀, 17 nymphs (in alcohol), same data as holotype. Transvaal—3 males, 3 nymphs (in alcohol), 20 mi. NE Machadodorp, Schoemanskloof, 4300 ft., 22 Mar. 1968 (ex: *Buddleia salviifolia*) (RTS).

This species is named for its very light coloration.

Zanchius alba is the largest South African species of the genus. It is totally white or cream colored, becoming somewhat brownish in specimens preserved in alcohol. *Z. alba* is most easily separated from other South African species, particularly *Z. leucosideae*, by the length-width ratio of the head (see key).

Zanchius alba was taken on *Buddleia salviifolia* (Loganiaceae) at all collection localities, but never at the same localities as *Z. buddleiae*, which apparently has the same host.

***Zanchius buddleiae*, new species**

Figure 20

MACROPTEROUS MALE: Basic coloration of body and appendages dull, opaque white; hemelytra translucent, nearly devoid of white pigmentation, weakly and irregularly suffused with blue-green (this is absent in some specimens); dorsum with yellow-orange markings as follows—vertex medially at level of posterior margin of eyes with small round spot, posterior lobe of pronotum medially and on each side about one-third distance mesially from lateral margins with elongate markings, clavus with elongate streak, corium with elongate streaks along claval suture, claval commissure, and parallel to lateral margin of posterior half of clavus, cuneus with

round spot basomedially, and large cell of membrane with small spot medially.

Body surface, pubescence, and structure very similar to *Z. alba* and *Z. leucosideae*, except as follows—head more or less quadrate, labium just attaining distal end of metacoxae, and posterior margin of pronotum very weakly sinuate.

MEASUREMENTS: Total length 2.92, maximum width .80, length head .28, width head .54, interocular space .24, length pronotum .28, width pronotum .60, length scutellum .38, width scutellum .50, length corium 1.50, length clavus 1.00, length cuneus .56, width cuneus .22, length claval commissure .58, distance apex commissure-apex membrane 1.24, length metatibia 1.60; length antennal segments 1—.28, 2—1.10, 3—.52, 4—.46; length labial segments 1—.24, 2—.26, 3—.34, 4—.26.

MALE GENITALIA: Not illustrated. See generic discussion.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Nat. Botanical Gardens, Pretoria, 22 November 1967, J. A. & S. Slater, T. Schuh (Adults and nymphs on *Buddleia salviifolia* [L.] Lam.) (SANC).

PARATYPES: 9 macropterous ♂♂, 23 macropterous ♀♀, same data as holotype (SANC, HM, JAS, RTS).

ADDITIONAL SPECIMENS: 30 macropterous ♂♂, 3 macropterous ♀♀, 4 nymphs (in alcohol), same data as holotype (RTS).

This species is named for the host plant genus, *Buddleia*.

Zanchius buddleiae most closely resembles *Z. alba*, but is much smaller, has orange markings on the pronotum and hemelytra and has a rather quadrate head compared to the broad head of *alba* (see key).

Zanchius buddleiae is apparently host specific on *Buddleia salviifolia* (Loganiaceae).

***Zanchius leucosideae*, new species**

Figure 21

MACROPTEROUS MALE: Basic coloration dull light green; legs, antennae, and labium infusate apically.

Entire body surface smooth, dull or weakly shining; hemelytra

→

FIGS. 19–22. Orthotylini. Fig. 19. *Zanchius alba*, male, holotype. Fig. 20. *Zanchius buddleiae*, male (Pretoria, Transvaal). Fig. 21. *Zanchius leucosideae*, male, holotype. Fig. 22. *Zanchius nigroleneatus*, male, holotype.



subhyaline; vestiture essentially as in *Z. buddleiae*, except eyes glabrous.

Structurally very similar to *Z. alba* and *Z. buddleiae*, except as follows—head more or less quadrate (see measurements); labium noticeably surpassing metacoxae; posterior margin of pronotum broadly excavated across mesoscutum.

MEASUREMENTS: Total length 3.48, maximum width 1.10, length head .30, width head .60, interocular space .24, length pronotum .28, width pronotum .70, length scutellum .52, width scutellum .64, length corium 1.84, length clavus 1.14, length cuneus .70, width cuneus .30, length claval commissure .70, distance apex commissure-apex membrane 1.80, length metatibia 2.34, length antennal segments 1—.38, 2—1.36, 3—.84, 4—.42, length labial segments 1—.26, 2—.32, 3—.58, 4—.42.

MALE GENITALIA: Not illustrated. See generic discussion.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: Natal, Sani Pass, 6200 ft., 10 Mar. 1968, T. Schuh, S. Slater, M. Sweet (SANC).

PARATYPES: Natal—1 macropterous ♂, same data as holotype; 1 macropterous ♂, Sani Pass, 6000 ft., 10 Mar. 1968. Orange Free State—2 macropterous ♀♀, 5 mi. N. Golden Gate Park, 17 Oct. 1967 (SANC, RTS).

This species is named for the host plant genus, *Leucosidea*.

Zanchius leucosideae resembles *alba* and *buddleiae*, but can be separated from the former by its more quadrate head and from the latter by its uniformly pale green coloration.

Zanchius leucosideae is known to occur only on *Leucosidea sericea* Eckl. and Zeyh. (Rosaceae), which is endemic to South Africa (Phillips, 1951).

***Zanchius nigrolineatus*, new species**

Figure 22

MACROPTEROUS MALE: Basic coloration very light green or yellow green, hemelytra hyaline; veins of membrane greenish, membrane yellowish; antennae yellowish, segment 1 with broad black stripe laterally, extending entire length of segment, except for extreme distal end, segment 2 black proximally; tibiae yellowish; dull gray spot present at middle of inner vein of large cell and near apex of small cell; black spot present on vein at inner apical angle of large cell.

Entire body and appendages smooth, shining; dorsum with light, moderately long (about length of greatest diameter of antennal segment 1), semierect hairs; antennae with short decumbent pubes-

cence, segment 1 with some longer semierect hairs; abdominal venter with moderately long, semierect hairs; legs with fine light hairs; tibiae with a few very fine, light spines about length of tibial diameter.

Head quadrate, eyes set far forward, distance from posterior margin of eye to posterior margin of head slightly less than longitudinal diameter of an eye; vertex flat; frons convexly rounded between antennal bases, clypeus just visible from above; eyes distinctly protuberant, granular, with short hairs (visible at 50 $\times$); antennae inserted just above ventral margin of eyes, fossae contiguous with eyes; antennal segment 1 moderately enlarged, greatest diameter near base, segment 2 about two-thirds diameter of segment 1, segments 3 and 4 subequal in diameter, about two-thirds diameter of segment 2; bucculae moderately developed; labium reaching distal end of metacoxae; pronotum flat, depressed behind weakly elevated calli; anterior, lateral, and posterior margins of pronotum nearly straight; mesoscutum exposed, about one-third length of scutellum, separated from scutellum by medially interrupted, weak, transverse impression; scutellum flat; lateral margins of hemelytra weakly convexly rounded; cuneal incisure obsolete, fracture at right angles to lateral corial margin; veins of membrane heavy, inner vein nearly parallel to mesial margin of cuneus; apex of abdomen not quite attaining cuneus; metatarsal segment 1 about one-half length of segment 2, segment 2 about 1½ times length of segment 1.

MEASUREMENTS: Total length 3.56, maximum width 1.16, length head .30, width head .56, interocular space .24, length pronotum .39, width pronotum .84, length scutellum .50, width scutellum .60, length corium 1.76, length clavus 1.24, length cuneus .64, width cuneus .28, length claval commissure .70, distance apex commissure-apex membrane 1.55, length metatibia 1.96; length antennal segments 1—.36, 2—1.34, 3—.64, 4—approx. .70; length labial segments 1—.22, 2—.26, 3—.36, 4—.38.

MALE GENITALIA: Not illustrated. See generic discussion.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Kruger Nat. Park, 3 mi. E. Skukuza Camp, 25 Apr. 1968, T. Schuh, J. A. & S. Slater, M. Sweet (SANC).

PARATYPES: *Transvaal*—3 macropterous ♂♂, 6 macropterous ♀♀, same data as holotype; 1 macropterous ♂, Kruger Nat. Park, Oliphants River near Oliphants Camp, 30 Apr. 1968 (SANC, JAS, RTS).

This species is named for the black stripe on the first antennal segment.

Zanchius nigrolineatus is the most distinctive of the South Af-

rican species of the genus, especially in the structure of the head and pronotum. It can be easily separated from the other described species by the black stripe laterally on antennal segment 1.

The specimens from the type locality were taken on *Lantana* sp. (Verbenaceae).

SUBFAMILY PHYLINAE

TRIBE HALLODAPINI

Acrorrhinium Noualhier

Acrorrhinium Noualhier, 1895, p. 176.

Cinnamus Distant, 1909a, p. 441. **New Synonymy.**

Acrorrhinium can be characterized as follows—

MACROPTEROUS MALE: Very elongate, nearly parallel sided; coloration pattern either mottled or with one or two contrasting hemelytral maculae.

Body surface smooth, dull, or weakly shining; dorsum usually with short decumbent hairs, sometimes with erect peg-like hairs; antennae with short dense vestiture; abdominal venter with semi-decumbent shining hairs.

Eyes protuberant, nearly hemispherical, removed from anterior margin of pronotum by at least one-third diameter of eye; head neck-like behind eyes; vertex horizontal; frons strongly convex, produced into more or less attenuated spine above clypeus, with five anteromedially directed transverse rugosities posterior to spine; clypeus compressed laterally, nearly vertical; antennae inserted at or just below middle of anterior margin of eyes, fossae contiguous with or only slightly removed from anterior margins of eyes; antennal segment 1 somewhat enlarged, about equal to length of head, segment 2 about three-fourths diameter of segment 1, occasionally increasing in diameter distally, segments 3 and 4 subequal in diameter, about three-fourths diameter of segment 2; labium reaching or surpassing metacoxae; pronotum with distinct transverse impression demarcating narrowed anterior lobe with flat collar about as wide as diameter of antennal segment 1, and steeply inclined, strongly swollen, broad posterior lobe; mesoscutum exposed, separated from scutellum by well defined transverse impression, inclined anteriorly; scutellum distinctly convex; clavus more or less inclined mesially to form ridge along claval commissure; cuneal incisure usually distinct; membrane with two cells, the outer small, elongate, triangular, the inner large, rectangular, reaching to about apex of cuneus; legs long; tibiae with longitudinal rows of tiny, closely spaced, black

spines and scattered semierect spines about length of tibial diameter; tarsal claws long, smoothly curved; parempodia hair-like, parallel; pulvilli minute.

MALE GENITALIA: Figures 113–144. Genital capsule usually with a posteroventral spine; vesica strongly twisted, S-shaped; phalotheca L-shaped; left clasper trough-like, right clasper lanceolate.

BRACHYPTEROUS FEMALE: See *A. drakensbergensis* and *A. formicarium*.

FEMALE GENITALIA: Figures 145, 146. Sclerotized rings small, unusual in Hallodapini; posterior wall a simple sclerotized plate.

Acrorrhinium can be separated from all other members of the Phylinae by the spiniform frons.

Wagner (1970b) felt that *Acrorrhinium* was closely related to *Aeolocoris* and created a new tribe, the Aeolocorini, for these and other genera. I do not recognize this tribe, although as can be seen from the following discussion, *Acrorrhinium* and related genera do form a distinct group within the Hallodapini. Wagner based this relationship on the form of the male genitalia of *Aeolocoris vidali* (Wagner) and on external characters in *A. vidali* and *Acrorrhinium conspersum*, although he did not have access to the male genitalia of the latter species. The male genitalia of the *Acrorrhinium* species in South Africa show a specialized condition over those of *Aeolocoris*, at least as illustrated by Wagner (1970b), particularly in the apical region of the vesica which bears peculiar spine-like projections in *Acrorrhinium* and is simple in *Aeolocoris*. Other characters in *Acrorrhinium*, including the sclerotized rings in the female, and the spiniform frons, also suggest considerable specialization. Even though the genus does possess a number of specialized characters, it does show its closest relationship to *Aeolocoris* and allied genera, including *Azizus*, *Trichophorella*, and *Marmorodapus*, based on the coloration pattern (which is often marmorate), the peculiar peg-like hairs (although these are much less common in *Acrorrhinium* than in other genera), and the virtual absence of hemelytral fasciae (present in some species of *Acrorrhinium*).

Examination of the holotype female of *Cinnamus rhinocerus* Distant in the British Museum (Natural History), indicates that this species is not a member of the Cylapinae as indicated by Carvalho (1952a), but actually a species of *Acrorrhinium*, very closely related to *A. pusae* Ballard. The general body form, including the spiniform frons, and the pattern of coloration of *rhinocerus* are similar to *A. pusae* and *A. lupa*. I am therefore synonymizing *Cinnamus* Distant with *Acrorrhinium* Noualhier.

The South African species of *Acrorrhinium* can be divided into two rather distinct groups: the *A. brincki* group includes *A. brincki*, *A. drakensbergensis*, *A. capensis*, *A. oudtshoornensis*, and *A. monticola*, all of which have castaneous markings on the corium as well as contrasting white hemelytral maculae (except in *monticola*, which is nearly unicolorous dull gray, although this may be a secondary loss of the more distinct color pattern found in the other species), dark unicolorous femora (see however *brincki*), and a dark first antennal segment contrasting with the much lighter second segment; the *A. muntingi* group includes *A. muntingi* and *A. incrassata* (and possibly a third undescribed species represented by a single macropterous specimen, lacking the abdomen, from Matjiesfontein, Cape Province, deposited in the British Museum [Natural History]), which are larger than the species of the *brincki* group, have the hemelytra rounded in transverse cross section, forming a humped appearance, and have femora and first antennal segments that are relatively light colored with numerous contrasting spots. Also the head is much smaller relative to the total body size in the *muntingi* group than in the *brincki* group. In South Africa, *A. formicarium* forms what is probably a third group, based on the rather anomalous structure of the female. Until males are known it will be difficult to assess the exact relationship of *formicarium* within the genus. Of the species of *Acrorrhinium* occurring outside South Africa, *acutum* Odhiambo, *hebes* Odhiambo, *pauliana* Carvalho, *nilgiriensis* (Distant), *monoceros* (Distant), *lupa* (Delattre), and *spicatus* (Distant) are all probably related to the *brincki* group; *conspersus* Noualhier, *pusae* (Ballard), and *rhinocerus* (Distant) seem to form another distinct group within the genus.

Most of the known species of *Acrorrhinium* are from light traps; the females are unknown for four of the eight South African species and of the four species where females are known, only *A. brincki* includes macropterous specimens, and in this case no brachypterous specimens are known. Odhiambo (1959c) records macropterous females for *A. acutum*. The large series of *A. muntingi* taken at light with no females may indicate that the females are only rarely macropterous in this species, if at all, or that they are not attracted to lights. All species are probably ground living judging from those that have been observed in the field. The macropterous forms do not appear particularly ant mimetic when alive, but behavior of the brachypterous forms is very ant-like (see species discussion for *A. oudtshoornensis*).

List of described species of *Acrorrhinium*

- acutum* Odhiambo (*Acrorrhinium*), 1959c, p. 673. Kenya.
brincki Carvalho and Becker (*Acrorrhinium*), 1960, p. 453. South Africa: Natal.
capensis, new species. South Africa: Cape Province.
conspersus Noualhier (*Acrorrhinium*), 1895, p. 176. Anatolia; Syria.
drakensbergensis, new species. South Africa: Natal; Transvaal; Lesotho.
formicarium Poppius (*Ectmetocranum*), 1914a, p. 36. South Africa: Cape Town.
hebes Odhiambo (*Acrorrhinium*), 1959c, p. 676. Kenya.
incrassata, new species. South Africa: Cape Province, Transvaal.
lupa Delattre (*Seversyia*), 1950, p. 152. Ivory Coast: Bouaké.
monoceros Distant (*Armachanus*), 1904c, p. 478. Ceylon.
monticola, new species. South Africa: Cape Province.
nilgiriensis Distant (*Armachanus*), 1909b, p. 60. South India: Nilgiri Hills.
oudtshoornensis, new species. South Africa: Cape Province.
pauliani Carvalho (*Acrorrhinium*), 1953a, p. 45. Madagascar.
pusae Ballard (*Armachanus*), 1927, p. 67. North India: Bihar.
rhinoceros Distant (*Cinnamus*), 1909a, p. 442. **New Combination.** Ceylon.
spicatus Distant (*Armachanus*), 1904b, p. 203. North-western Australia.

KEY TO SOUTH AFRICAN SPECIES OF *Acrorrhinium*

Macropterous specimens

1. Metafemora with light ground color and numerous small brownish or reddish spots 2
 Metafemora either entirely dark or dark distally and light proximally 3
2. Vertex and frons light with narrow, median, longitudinal reddish stripe; antennal segment 2 incrassate distally *incrassata*
 Vertex and frons mottled dorsally, without longitudinal reddish stripe; antennal segment 2 of uniform diameter *muntingi*
3. Metafemora light proximally and dark distally *brincki*
 Metafemora dark, unicolorous 4

4. Corium with reddish or castaneous areas strongly contrasting with white maculae; tibiae without dark dorsal stripe as below 5
Corium generally dull grayish brown with only weakly contrasting light maculae; tibiae with dark brown longitudinal dorsal stripe *monticola*
5. Corium with at least part of lateral margin dark (castaneous) (Fig. 23) 6
Corium with lateral margin (exocorium) light unicolorous *drakensbergensis*
6. Membrane with light halo-like areas between cunei; large species, length 6.40 mm.; ground color reddish brown *capensis*
Membrane unicolorous, without halo-like area; small species, length 5.20 mm.; ground color dark castaneous *oudtshoornensis* (Fig. 23)

Brachypterous specimens

1. Hemelytra strongly upturned apically; entire dorsum and legs castaneous, polished, covered with long, erect, light hairs *formicarium*
Hemelytra flat; dorsum and legs dull, if castaneous or partly so, with only short, decumbent hairs 2
2. All tarsal segments dark brown *oudtshoornensis*
All tarsal segments tan *drakensbergensis* (Fig. 24)

***Acrorrhinium brincki* Carvalho and Becker**

Figures 113, 120–123

Acrorrhinium brincki Carvalho, Dutra, and Becker, 1960, pp. 453–454.

Acrorrhinium brincki is very similar to *A. drakensbergensis*, described below, but differs from it in having the metafemora light proximally and dark distally; no other species in South Africa has this type of metafemoral coloration. This species was originally described from a macropterous female. Male specimens are now available and it is apparent that the structure of the two sexes is very similar.

MEASUREMENTS: Macropterous ♂—Total length 5.92, greatest width 1.70.

MALE GENITALIA: Figures 113, 120–123.

This species is known from relatively high elevations along the Drakensberg Escarpment (circa 1875 meters; 6000 feet) and from the high veld of the Transvaal. No biological information is available. Moderate numbers of male and female specimens were collected at an UV light in a light rain at Giants Castle Park, Natal, in early March, 1968. This is an area with a high proportion of macchia-related plants.

SPECIMENS EXAMINED: *Natal*—1 macropterous ♀, Royal Natal National Park, The Hostel, 3.IV.51, at light in evening (Brinck and Rudebeck) (holotype); 1 macropterous ♂, Royal Natal National Park, Tendele Camp, 5400 ft., 4–5 Mar. 1968, UV light; 1 macropterous ♀, Natal National Park, iii.1932 (Ogilvie); 1 macropterous ♂, Mont-aux-Sources, 4–6.IV.1954 (Vari); 1 macropterous ♂, 11 macropterous ♀♀, Giants Castle Park, 5800 ft. elevation, 6 Mar. 1968, UV light. *Transvaal*—1 macropterous ♂, Lake Chrissie, 6 Nov. 1967; 1 macropterous ♀, Pretoria, 6.IV.1954, at light in evening (Rudebeck) (paratype) (SANC, TM, LU, BM [NH], JAS, RTS).

***Acrorrhinium capensis*, new species**

Figures 116, 131–133

MACROPTEROUS MALE: Basic coloration light mahogany; antennal segments 2 and 3 and all tibiae yellow; ostiolar peritreme, anterior half of corium, and quadrate macula at apex of corium adjacent to cuneal fracture white; elongate rectangular macula on endocorium just posterior to middle and contiguous with anterior white macula castaneous; membrane smoky brown with round, white, halo-like area between cunei; costal vein on corium at cuneal fracture orange; tarsi brown.

Dorsal surface with scattered, short, decumbent, sericeous hairs; antennal segment 1 with decumbent dark hairs; antennal segments 2, 3, and 4 with dense, short vestiture; femora with scattered, short, dark, decumbent hairs.

Eyes removed from anterior margin of pronotum by distance equal to one-third diameter of eye; vertex with weak transverse impression at level of posterior margin of eyes; spiniform frons not obscuring clypeus from above; antennal segment 1 moderately enlarged with several erect black spines on interior surface; antennal segments 3 and 4 slightly smaller in diameter than segment 2, segment 2 about one-half diameter of segment 1; labium reaching to about abdominal sternite 3; posterior margin of pronotum evenly concave; tibiae with dark spines; metatarsal segments 1 and 2 subequal in length; segment 3 one-and-a-half times length of segment 2.

MEASUREMENTS: Total length 6.40, maximum width 1.84, length head .76, width head .82, interocular space .36, length pronotum .62, width pronotum 1.32, length scutellum 1.04, width scutellum 1.08, length corium 3.04, length clavus 2.56, length cuneus 1.00, width cuneus .62, length claval commissure 1.46, distance apex commissure-apex membrane 2.76, length metatibia 4.12; length

antennal segments 1—.78, 2—2.76, 3—2.08, 4—.96; length labial segments 1—.74, 2—.72, 3—?, 4—?.

MALE GENITALIA: Figures 116, 131–133.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Knysna, Garden of Eden, 16–20.I.1955, A. J. T. Janse (TM).

PARATYPE: *Cape Province*—1 macropterous ♂, Cape Town, Kirstenbosch, 5–29.XII.1954 (Janse) (RTS).

See key and *A. oudtshoornensis* discussion for separation of *capensis* from other South African species.

***Acrorrhinium drakensbergensis*, new species**

Figures 24, 114, 124–127, 145, 146

MACROPTEROUS MALE: General coloration dull brown; antennal segment 1, entire cuneus, procoxae and mesocoxae, and genital segment castaneous; elongate streak medially on clavus near claval suture and heavy quadrate macula submedially on endocorium deep mahogany; vertex between and behind eyes, anterior two-thirds of pronotum on either side of midline, antennal segment 1 proximally, distal two-thirds of antennal segment 4, area around antennal fossae, streaked area above and below eyes posteriorly extending onto pronotum, and distal margin of mesotrochanters and metatrochanters suffused with red; midline of pronotum, anterior half endocorium (anterior to large castaneous macula), exocorium generally, antennal segments 2 and 3 and proximal third of segment 4, all tibiae and tarsi, and basal 2 segments of abdomen yellowish white; metacoxae gray to whitish; labium and profemora light brown; membrane with a round, halo-like, white suffused area between cunei.

Entire body smooth, dull or only weakly shining; dorsum and thorax ventrally with scattered, short, decumbent, silvery hairs; antennae with very short, dense, shining hairs; coxae and femora with a few, scattered, semidecumbent hairs.

Eyes removed from anterior margin of pronotum by distance equal to about one-third diameter of eye; vertex shallowly transversely sulcate at level of anterior margin of eyes; spiniform frons not obscuring clypeus from above; antennal segment 1 moderately enlarged, almost twice diameter of segment 2, segment 2 slightly greater in diameter than segments 3 and 4; labium reaching onto anterior third of abdomen; tibiae with a few very fine, light hairs and a few light spines mostly on ventral surfaces, about the length of tibial diameter; metatarsal segments subequal in length.

MEASUREMENTS: Total length 4.96, maximum width ?, length head .66, width head .70, interocular space .30, length pronotum .56, width pronotum 1.20, length scutellum .72, width scutellum .90, length corium 2.34, length clavus 1.74, length cuneus .68, width cuneus .26, length claval commissure 1.00, distance apex commissure-apex membrane 2.18, length metatibia 3.40; length antennal segments 1—.70, 2—2.32, 3—1.70, 4—1.00; length labial segments 1—.58, 2—.62, 3—.56, 4—.66.

MALE GENITALIA: Figures 114, 124–127.

BRACHYPTEROUS FEMALE: Head, thorax, and scutellum mostly yellowish; abdomen, procoxae and mesocoxae, all femora and labium deep brown with reddish suffusion; antennal segments 2 and 3 (and basal quarter of 4—from paratype), metacoxae, and all tibiae and tarsi light yellowish; posterior portion of vertex, collar area of pronotum (and remainder of pronotum faintly), and most of scutellum on either side of light longitudinal midline (and distal three-fourths of antennal segment 4—from paratype) reddish (also longitudinal reddish stripes at level of antennal fossae on genae, at dorsal and ventral margins of eyes on posterior portion of head and extending onto pronotum, and 2 longitudinal stripes on propimeron); hemelytra mostly light translucent, broadly suffused with brown along scutellum and claval commissure; small roundish mark at level of apex of scutellum on corium and large trapezoidal macula (with long extension from the anterior mesial corner) at level of claval commissure medially on corium, very dark brown; antennal segment 1 light brown.

Body surface and vestiture similar to male; eyes with a few very short hairs.

Structure of head similar to male, eyes smaller and vertex relatively wider than in male; labium reaching posterior margin of abdominal sternite 3; pronotum not strongly constricted anteriorly, nearly flat longitudinally; pronotal collar about as wide as diameter of antennal segment 1, well defined laterally, indistinct dorsally; posterior margin of pronotum shallowly and evenly concave; scutellum flattened longitudinally, weakly convex transversely; hemelytra greatly reduced, undifferentiated, reaching middle of abdominal tergite 4; posterior margin of hemelytra evenly rounded beginning at claval commissure, slightly upturned; abdomen broad medially (no gravid specimens examined but the abdomen presumably becomes swollen and bulbous), pointed at anus; tibiae as in male.

MEASUREMENTS: Total length 4.40, maximum width ?, length head .76, width head .70, interocular space .40, length pronotum

.60, width pronotum .84, length scutellum .56, width scutellum .63, length hemelytron 1.40, length metatibia 3.68; length antennal segments 1—.80, 2—2.56, 3—2.00, 4—1.16; length labial segments 1—.70, 2—.56, 3—.70, 4—.62.

FEMALE GENITALIA: Figures 145, 146.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Natal*, Royal Natal Nat. Pk., Tendele Camp, 5400 ft., 4–5 Mar. 1968, T. Schuh, J. A. & S. Slater, M. Sweet, UV Light Trap (SANC).

PARATYPES: *Cape Province*—1 macropterous ♂, Knysna, Keurbooms River, Jan. 1931 (Barnard). *Natal*—1 macropterous ♂, same data as holotype; 1 brachypterous ♀, *idem*, but not at UV light; 1 macropterous ♂, Howick; 1 macropterous ♂, P. Shepstone, 5.97. *Transvaal*—1 macropterous ♂, Blouberg, Motlakeng, 5–6000 ft., 6–15.1.1955; 1 macropterous ♂, Pretoria, 22.12.1910 (Swierstra). *LESOTHO*—3 brachypterous ♀♀, Sani Pass, 8000 ft., 10 Mar. 1968 (SANC, TM, BM[NH], JAS, RTS).

This species is named for its occurrence on the Drakensberg.

Acrorrhinium drakensbergensis appears to be most closely related to *A. brincki*, *A. capensis*, and *A. oudtshoornensis*. The unicolorous metafemora will separate it from *brincki*, the light unicolorous corial margin from *oudtshoornensis* and *capensis*. The brachypterous females of *drakensbergensis* are very similar to those of *oudtshoornensis* but can be separated as in the key.

In the series of males examined the length of the labium varies from just surpassing the metacoxae to reaching about one-third the length of the abdomen.

The three brachypterous females from Lesotho, Sani Pass, were collected in association with *Chrysocoma tenuifolia* Berg. (Compositae).

***Acrorrhinium formicarium* (Poppius)**

Ectmetocranum formicarium Poppius, 1914a, p. 37.

Acrorrhinium formicarium is one of the most specialized species in the genus and to date is known only from the brachypterous female. The structure of the head is the only feature that obviously relates this species to the other members of the genus. The clypeus is strongly flattened and greatly produced and the frontal spine is proboscis-like. The entire body and all of the appendages are castaneous, highly polished, and covered with long, erect, light-colored hairs. The posterior margin of the pronotum is upturned. The scutellum is slightly elevated. The hemelytra are upturned just past the apex of the scutellum and form two points nearly as high as

the dorsum of the bulbous abdomen. The tibiae lack the longitudinal rows of tiny spines found in all other species of *Acrorrhinium*. The figure of *A. formicarium* in Poppius (1921) is basically accurate. When the male of this species is known it will be much easier to assess its relationship to other species in the genus.

Poppius (1914a) stated that the two type females of *A. formicarium* were deposited in the Paris Museum. In fact, none are in Paris, but at least one is in the Helsinki Museum, and I am designating it as the lectotype. It bears the labels: "Museum Paris, Cape-Town, E. Simon, Coll. Noualhier 1898"; "*Ectmetocranum formicarium* n. gen. et sp. B. Poppius det."; "Mus. Zool. H:fors, Spec. typ. No. 7786, *Ectmetocranum formicarium* Popp."; and "LECTOTYPE *Ectmetocranum formicarium* Poppius, det. R. T. Schuh."

***Acrorrhinium incrassata*, new species**

Figures 119, 138–140

MACROPTEROUS MALE: General coloration light brownish yellow with the following dull red markings: narrow stripe on dorsal midline of head (interrupted at level of posterior margin of eyes), narrow stripe on either side of midline of anterior lobe of pronotum, posterior third of scutellum on either side of midline, two lines on head at level of dorsal margin of eyes and just below dorsal margin of eyes running anteriorly from eyes to antennal fossae and posteriorly to pronotum, line near ventral margin of eyes between eye and pronotum, lower margin of juga, two parallel lines on entire lateral margin of pronotum, numerous small spots on all femora (particularly mesofemora and metafemora), and suffused areas at apex of clavus and corium at cuneal fracture; posterior lobe of pronotum, most of scutellum, elongate area on corium along claval suture at level of midpoint of claval suture, venter of mesothorax, and most of genital segment black; antennal segment 2 distally, antennal segments 3 and 4, and all tarsi dark brown; irregular marking on corium contiguous laterally with elongate black area described above and diffuse marking on clavus at same level white; much of corium and cuneus suffused with brown, veins lighter; membrane light yellow gray; pronotum and scutellum with distinct yellow midline dorsally.

Entire body smooth, dull; dorsum with a few scattered, decumbent, very short, silvery hairs antennal segments 2, 3, and 4 with dense, short, shining vestiture; tibiae and tarsi with short, dull hairs.

Eyes removed from anterior margin of pronotum by distance

equal to about one-third diameter of eye; spine-like projection of frons very short; antennal segment 1 only very slightly enlarged, segment 2 increasing in diameter distally to same diameter as segment 1, segments 3 and 4 about same diameter as segment 2 proximally, about two-thirds diameter of segment 1; labium attaining distal end of metacoxae; pronotal collar about equal in width to diameter of antennal segment 3; posterior margin of pronotum shallowly concave; femora with a few, very fine, erect spines; tibiae with scattered dark spines about equal in length to tibial diameter; metatarsal segments subequal in length.

MEASUREMENTS: Total length 7.52, maximum width 2.24, length head .90, width head .90, interocular space .40, length pronotum .80, width pronotum 1.60, length scutellum 1.10, width scutellum 1.30, length corium 3.60, length clavus 2.68, length cuneus 1.24, width cuneus .56, length claval commissure 1.60, distance apex commissure-apex membrane 3.40, length metatibia 4.32; length antennal segments 1—1.02, 2—2.72, 3—1.96, 4—1.02; length labial segments 1—.78, 2—.84, 3—.64, 4—.74.

MALE GENITALIA: Figures 119, 138–140.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Grootfontein, Middelburg, 4.XI.65, E. Schoombee (SANC).

PARATYPES: 1 macropterous ♂, same data as holotype, except 3.XII.1965. *Transvaal*—1 macropterous ♂, Zomerkomst, Politzi, 23.X.64 (Johannsmeier) (SANC, RTS).

This species is named for the incrassate second antennal segment. See discussion under *A. muntingi* for distinguishing characteristics.

***Acrorrhinium monticola*, new species**

Figures 117, 134–137

MACROPTEROUS MALE: General coloration dull gray-brown; anterior lobe of pronotum, scutellum (except as noted below), cuneus, thoracic pleura and venter, abdominal venter, and labial segments 2, 3, and 4 dark brown; medium brown as follows: dorsal surface of frons, much of vertex between eyes posteriorly, posterior lobe of pronotum (except as below), diffuse area medially on corium, antennal segment 1, and all femora; white as follows: clypeus, lora, metathoracic scent gland opening, longitudinal stripe on extreme posterior pronotal lobe medially and midlaterally (midlateral stripes not present in paratype), longitudinal stripe on posterior lobe of scutellum, ovoid spot just anterior to brown area medially on corium, and apex of corium at cuneus; antennal segments 2 and

3 yellow-white, segment 2 white basally; tibiae cream with contrasting longitudinal dorsal stripe; tibiae distally, and tarsi black.

Entire body smooth, dull; dorsum with scattered (almost scale-like), short, decumbent, sericeous hairs; antennal segment 1 with short, dark, decumbent hairs; femora with scattered short hairs; tibiae with a few semidecumbent hairs distally.

Eyes removed from anterior margin of pronotum by distance equal to about one-third diameter of eye; spine-like process of frons short, blunt; antennal segment 1 moderately enlarged, with several erect, black spines on interior surface, segments 2 and 3 of equal diameter, about half diameter of segment 1 (segment 4 missing); labium reaching posterior margin of abdominal sternite 5 (from paratype); posterior pronotal margin straight; femora with a few erect, thin, black spines mostly on dorsal surface; tibiae with scattered dark spines with dark bases; metatarsal segments subequal in length.

MEASUREMENTS: Total length 6.80, maximum width ?, length head .88, width head .90, interocular space .36, length pronotum .74, width pronotum 1.36, length scutellum 1.10, width scutellum .96, length corium 3.28, length clavus 2.52, length cuneus 1.16, width cuneus .80, length claval commissure 1.48, distance apex commissure-apex membrane 2.76, length metatibia 4.36; length antennal segments 1—1.00, 2—2.52, 3—2.08, 4—?; length labial segments 1—.80, 2—.84, 3—.68, 4—.80.

MALE GENITALIA: Figures 117, 134—137.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Bainskloof Pass Summit, 21 Jan. 1968, J. A. & S. Slater, T. Schuh, M. Sweet (SANC).

PARATYPE: 1 macropterous ♂, same data as holotype, but at UV light (RTS).

This species is named for its occurrence in the mountains of the Southwest Cape.

A. monticola is distinctive among the South African species of *Acrorrhinium* by virtue of its dull gray coloration and the dark brown stripe on the dorsal surface of the tibiae.

***Acrorrhinium muntingi*, new species**

Figures 118, 141—144

MACROPTEROUS MALE: General coloration light yellowish brown, with dark brown markings as follows: vertex between eyes irregularly, distinct transverse lines anteriorly on vertex (behind

spine), most of pronotum on either side of light midline, scutellum broadly around anterior and lateral margins, hemelytra suffused mostly on clavus and cuneus, labial segments 2, 3, and 4, thorax ventrally, abdomen ventrally (particularly anterior two-thirds of genital segment), antennal segment 1, and numerous small round spots on all femora; tibial spines with dark bases; tarsi black; midline of posterior lobe of scutellum suffused with red; pregenital abdominal segments lighter than most of venter and suffused with green.

Body smooth, weakly shining; dorsum with short, scattered, decumbent, silvery hairs; antennal segment 1 with dark decumbent hairs; antennal segments 2, 3, and 4 with short, very dense, shining vestiture; femora with scattered short hairs.

Eyes removed from anterior margin of pronotum by distance equal to about one-third diameter of eye; spine of frons very short; antennal segment 1 slightly greater in diameter than segment 2 (only segments 1 and 2 present in holotype); labium just surpassing metacoxae; posterior margin of pronotum slightly concave; femora with a few moderately long very thin spines; tibiae with scattered dark spines about length of tibial diameter; metatarsal segments subequal in length.

MEASUREMENTS: Total length 7.68, maximum width 2.00, length head .78, width head .92, interocular space .36, length pronotum .76, width pronotum 1.52, length scutellum 1.10, width scutellum 1.24, length corium 3.68, length clavus 2.84, length cuneus 1.40, width cuneus .54, length claval commissure 1.72, distance apex commissure-apex membrane 3.64, length metatibia 4.44; length antennal segments 1—1.06, 2—2.88, 3—?, 4—?; length labial segments 1—.82, 2—.82, 3 plus 4—1.54.

MALE GENITALIA: Figures 118, 141–144.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Grootfontein, Middelburg, 3.XII.1965. E. Schoombie (SANC).

PARATYPES: 8 macropterous ♂♂, same data as holotype; 2 macropterous ♂♂, same data as holotype, but "October, M. Johannesburg" (SANC, JAS, RTS).

This species is named for Mr. Jack Munting, formerly Curator of the South African National Collection of Insects, Pretoria.

A. muntingi and *A. incrassata* can be separated from the *brincki* group as indicated in the generic discussion. *A. muntingi* has a spotted first antennal segment, a second antennal segment of uniform diameter, and a mottled vertex, whereas *incrassata* has the

first antennal segment spotted but the second segment is enlarged distally; the vertex of *incrassata* is light, marked only with a median longitudinal red stripe.

***Acrorrhinium oudtshoornensis*, new species**

Figures 23, 115, 128–130

MACROPTEROUS MALE: General coloration dark gray-brown, suffused with red; antennal segments 2 and 3 (4 missing in holotype) and tibiae light yellowish gray; anterior third of corium and quadrate macula at apex of corium along cuneal fracture white; small area on corium at apex claval commissure suffused with white; quadrate macula on endocorium just posterior to and contiguous with white anterior portion of corium velvety castaneous; tarsi almost black; membrane dull gray-brown.

Entire body smooth, dull; abdominal venter weakly shining; dorsum with scattered, short, decumbent hairs; antennal segment 1 and femora with scattered, dark, decumbent hairs; antennal segments 2 and 3 with dense, short, shining vestiture.

Eyes removed from anterior margin of pronotum by distance equal to one-half diameter of eye; vertex with weak, longitudinal, median sulcus between eyes; spiniform frons conical, not obscuring clypeus from above; antennal segment 1 moderately enlarged, almost twice diameter of segment 2, segment 2 of slightly greater diameter than segment 3; labium attaining distal end of metacoxae; posterior margin of pronotum very shallowly concave; tibiae and tarsi with scattered dark spines with dark bases; metatarsal segments subequal in length.

MEASUREMENTS: Total length 5.20, maximum width 1.38, length head .66, width head .70, interocular space .36, length pronotum .60, width pronotum 1.16, length scutellum .78, width scutellum .92, length corium 2.40, length clavus 1.86, length cuneus .72, width cuneus .44, length claval commissure 1.06, distance apex commissure-apex membrane 2.20, length metatibia 3.32; length antennal segments 1—.58, 2—2.00, 3—1.54, 4—?; length labial segments 1—.64, 2—.64, 3—.40, 4—.60.

MALE GENITALIA: Figures 115, 128–130.

BRACHYPTEROUS FEMALE: Antennal segment 1, abdomen, procoxae and mesocoxae, and all femora dark gray brown suffused with red; most of head, pronotum, scutellum, and claval area of hemelytra yellowish gray; corial region of hemelytra, antennal segments 2 and 3, tibiae, and metacoxae yellow or yellow white; antennal segment

4 red; tarsi black; corium medially with heavy velvety black macula and an anteriorly contiguous oval white macula.

Body surface texture and vestiture as in male; eyes with a few very short hairs.

Structure very similar to that of brachypterous female of *A. drakensbergensis*; metatarsal segment 2 about half length of segment 3, segment 1 subequal in length to segment 3.

MEASUREMENTS: Total length 4.48, maximum width ?, length head .88, width head .80, width vertex .42, length pronotum .64, width pronotum .88, length scutellum .64, width scutellum .70, length hemelytra 1.84; length antennal segments 1—.80, 2—2.52, 3—1.80, 4—.92; length labial segments 1—.70, 2—.76, 3—.66, 4—.78.

FEMALE GENITALIA: See generic discussion.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Swartberg Pass, elevation 5000 ft., 25 mi. N. of Oudtshoorn, Platberg, 19 Nov. 1967, M. H. Sweet (SANC).

PARATYPES: *Cape Province*—1 macropterous ♂, same data as holotype; 1 macropterous ♂, 3 brachypterous ♀♀, just N. Outiniqua Pass Summit S. of Oudtshoorn, 7 Feb. 1968 (SANC, JAS, RTS).

ADDITIONAL SPECIMENS: 3 nymphs (in alcohol), just N. Outiniqua Pass Summit S. of Oudtshoorn, 7 Feb. 1968 (RTS).

This species is named for Oudtshoorn, the district in which all known specimens have been collected.

A. oudtshoornensis is most closely related to *A. capensis*, but is much smaller, much darker in coloration, and lacks the light halo-like area on the membrane.

The Outiniqua Pass specimens of *oudtshoornensis* were collected under *Helichrysum orbiculare* (Thunb.) Druce (Compositae) in association with workers of the ant *Anoplolepis* sp. The females of this species are very ant-like in their movements.

Azizus Distant

Azizus Distant, 1910a, p. 11.

Azizus is probably most closely related to *Aeolocoris*. It can be recognized by the large eyes of the males, the well defined pronotal collar, the mottled coloration, and the erect peg-like hairs on the dorsum and first antennal segment. The genus as presently constituted may bring together species that actually belong in different genera.

The type species of the genus, *A. basilius* Distant, is from India, whereas all other known species are from Africa.

List of described species of *Azizus*

basilius Distant (*Azizus*), 1910a, p. 11. India: Bengal.

basilewskyi Carvalho (*Azizus*), 1951b, p. 110. Congo.

* *dispar* Odhiambo (*Azizus*), see *Hallodapus dispar* (Odhiambo) **New Combination.**

oculatus Poppius (*Megacoeloides*), 1914a, p. 33. Togo; Swaziland.

***Azizus* near *oculatus* (Poppius)**

Megacoeloides oculatus Poppius, 1914a, p. 33.

A single male specimen with the data "Eranchi, Swaziland, XII-1954, Capener" is in the J. A. Slater Collection. Comparison of this specimen with type material of *A. oculatus* (see below) indicates that it is congeneric, if not conspecific, with *oculatus*. Unfortunately the male genitalia of the Swaziland specimen are very lightly sclerotized, probably because of its teneral condition, and therefore a critical comparison could not be made with other specimens of *oculatus*.

A male and female of *Azizus oculatus* from Togo, apparently part of Poppius' type series, are in the Helsinki Museum. Neither of these specimens appear to be the "type" of Poppius, but I am informed that it is also in Helsinki (personal communication, Martin Meinander). On subsequent examination of all specimens originally studied by Poppius a lectotype will have to be designated.

***Carinogulus*, new genus**

MACROPTEROUS MALE: Elongate, ant mimetic; head, pronotum, and scutellum granular or finely rugulose, weakly shining; posterior third of corium, apex of clavus, cuneus, cell of membrane, and adjacent membrane at base of cell highly polished, shining; legs and venter polished, shining; dorsum with short, decumbent, light hairs and sometimes scutellum, corium, and clavus also with a few long erect hairs; eyes glabrous; antennae with very short, light, appressed pubescence; labium with a few, short, erect hairs; femora with short, decumbent, light hairs, sometimes metafemora with longer, erect, rather dense hairs on ventral surface; tibiae with short decumbent, light hairs, and semierect, fine, light spines about as long as tibial diameter; abdominal venter with reclining light hairs.

Head strongly deflexed, either concave behind, or narrowed



behind eyes to form a short neck about as long as diameter of antennal segment 2 and as wide as interocular space; frons nearly vertical; eyes granular, large, reaching ventrally almost to gula; vertex raised above level of pronotal collar by at least diameter of antennal segment 2; vertex weakly convex or sometimes slightly depressed between eyes; frons transversely rugose; anterior margins of eyes sinuate; antennae inserted slightly above ventral margins of eyes; antennal fossae contiguous with anterior margins of eyes; antennal segment 1 slightly enlarged, segment 2 tapering proximally, distal diameter about equal to diameter of segment 1, segments 3 and 4 subequal to or slightly greater in diameter than distal end of segment 2; clypeus rounded transversely, prominent, separated from frons by distinct cleft; bucculae moderately expanded, crescent-shaped; gula moderately long, inclined, with distinct carina running from posterior margin of buccal cavity to posterior margin of head; pronotum tumid and strongly inclined posteriorly, strongly narrowed anteriorly, lateral margins nearly straight, posterior margin broadly rounded laterally, calli indistinct, defined only by slightly roughened surface texture; pronotal collar wide, flat; mesoscutum exposed, inclined anteriorly, steep-sided laterally; scutellum tumid, reaching dorsally to about height of pronotum; lateral corial margins reflexed ventrally on anterior half, distinctly sinuate, narrowest at level of midpoint of claval commissure; cuneal incisure obsolete; membrane with 2 cells; abdomen long, very narrow; femora nearly round, slightly enlarged in diameter apically, weakly bowed; tibiae with longitudinal rows of tiny, closely spaced spines; tarsal claws evenly curved, moderately long; parempodia hair-like, parallel; pulvilli minute.

MALE GENITALIA: Figures 147–159. Vesica twisted, S-shaped; apex of vesica weakly or strongly attenuated; phallosome either with “thumb-like” structure near basal opening (Figures 156, 159) or without “thumb” and with apex of complex structure (Figures 148, 152); left clasper trough-like; right clasper lanceolate.

Females unknown.

TYPE SPECIES: *Carinogulus varii*, new species.

This genus is named for the distinctive carinate gula.

←

FIGS. 23–26. Hallodapini. Fig. 23. *Acrorrhinium oudtshoornensis*, male, holotype. Fig. 24. *Acrorrhinium drakensbergensis*, female (Sani Pass, 8000 ft., Lesotho). Fig. 25. *Carinogulus hobohmi*, male, holotype. Fig. 26. *Carinogulus kochi*, male, holotype.

Carinogulus can be recognized by the relatively long, carinate gula in conjunction with the type of hemelytral fasciae that is also found in *Glaphyrocoris* (Figures 25, 26). Two distinct species groups exist within the genus: *C. kochi* and *C. varii* have the head convex behind and similar in structure to *Systellonotus*; *C. hobohmi* and *C. transvaalensis* have the head concave behind and similar in structure to *Glaphyrocoris*. Neither *Systellonotus* nor *Glaphyrocoris* have a carinate gula, however.

All species of *Carinogulus* are known only from macropterous males. No biological or ecological information is available, but the genus is probably ground living and adapted to very arid areas, as it is known only from the dry interior of the northern Transvaal and from South West Africa.

Carinogulus is probably most closely related to *Glaphyrocoris* from North Africa, but at the present time this affinity is unclear, because of the confused state of the taxonomy of *Glaphyrocoris* and closely related genera. The following discussion emphasizes some of the important aspects relative to the status of *Carinogulus* and its close relatives.

Carvalho (1952a) synonymized *Linoceraea* Horvath with *Glaphyrocoris* Reuter, but gave no explanation for the action. Hoberlandt (1953b), who was probably not aware of Carvalho's synonymy, noted that *Linoceraea* is most closely related to *Laemocoris*, *Trachaelonotus*, and *Cyrtopeltocoris*. Linnavuori (1964) moved *Laemocoris kiritschenkoi* (Poppius) to *Trachaelonotus* and discussed the relationship of *Trachaelonotus*, in the sense *T. kiritschenkoi*, to *Laemocoris* and *Glaphyrocoris*. In this discussion Linnavuori apparently based his conception of *Glaphyrocoris* on *G. lunigera* (Horvath), which is not the type species of *Glaphyrocoris*, but was originally described in *Linoceraea* and transferred to *Glaphyrocoris* by Carvalho (1952a). Comparison of *Glaphyrocoris unifasciatus* Reuter, the type species of the genus, and a redescription of *G. lunigera* (Hoberlandt, 1953b) reveals the following important differences between the two species: 1) *G. unifasciatus* lacks a ridge or raised carina on the posterior margin of the vertex which is present in *lunigera*; 2) the head and eyes are distinctly concave behind in *unifasciatus* so that the anterior margin of the pronotum is obscured, whereas in *lunigera* the head is not concave behind and the anterior margin of the pronotum is not obscured; and 3) the transverse fascia in *unifasciatus* is narrow and very sharply delimited, whereas in *lunigera* it is broad and somewhat diffuse. Linnavuori's (1964) figures of *T. kiritschenkoi* agree

closely with the characters outlined above for *G. lunigera*, but not with those of *G. unifasciatus*.

Linnavuori (1965) synonymized *Trachaelonotus*, in the sense of *T. unifasciatus* Reuter, the type species of the genus, with *Glaphyrocoris*, in the sense of *lunigera* Horvath. This action created a secondary homonym because *Glaphyrocoris* and *Trachaelonotus* both contained a species named *unifasciatus*. Linnavuori therefore proposed the new name *iranicus* for *Trachaelonotus unifasciatus* Reuter. The above discussion would seem to indicate, however, that *Linoceraea* is not synonymous with *Glaphyrocoris*, but instead possibly a synonym of *Trachaelonotus*. This situation would make the new name *iranicus* a junior objective synonym and the name *unifasciatus* would have to be applied under Article 59c of the International Code of Zoological Nomenclature.

The relationships of the above-mentioned genera are additionally complicated when the genus *Hypomimus* Lindberg is considered. Examination of the holotype of *Hypomimus albosellatus* Lindberg indicates that it is very closely related to *Glaphyrocoris unifasciatus*. Linnavuori (1961; 1964; 1965) and Odhiambo (1959c) have described additional species of *Hypomimus*, and these species must be carefully studied to confirm whether they form a distinct genus or are actually members of *Glaphyrocoris*.

KEY TO SPECIES OF *Carinogulus*

1. Head concave behind; dorsum with only decumbent hairs; hemelytral fascia nearly straight and parallel sided 2
 Head convex behind, forming very short neck; dorsum with decumbent hairs and some erect long hairs on scutellum and hemelytra; hemelytral fascia more or less irregular, not parallel sided 3
2. Hemelytral maculae uninterrupted, forming continuously parallel sided fascia across corium and clavus *transvaalensis*
 Hemelytral macula on corium placed anterior to that on clavus by distance equal to about width of macula ... *hobohmi* (Fig. 25)
3. Vertex slightly depressed, with distinct sulcus anteriorly; general coloration castaneous *varii*
 Vertex weakly convex, without sulcus; general coloration bright orange brown *kochi* (Fig. 26)

***Carinogulus hobohmi*, new species**

Figures 25, 151–153

MACROPTEROUS MALE: Basic coloration dark brown to mahogany, head and anterior third of pronotum somewhat lighter

than posterior two-thirds of pronotum; anterior three-fifths of clavus, except basally, rusty brown; parallel sided transverse macula on corium at level of apex of scutellum and transverse macula of similar width on clavus just posterior to corial macula white (Fig. 25); distal third of antennal segment 2 and fascia of uniform width on membrane at level of apex of cuneus suffused with white; mesotrochanters and metatrochanters, distal end of mesocoxae, distal two-thirds of metacoxae, and ostiolar peritreme white.

Dorsum weakly shining; rust brown area on clavus dull; remainder of hemelytra including membrane highly polished; dorsum and venter with scattered, short, decumbent hairs; metafemora with rather dense erect hairs on ventral surface.

Head concave behind; posterior margin of vertex finely carinate, just covering anterior margin of pronotum; vertex broad, nearly flat; antennal segment 1 scarcely enlarged, segment 2 increasing slightly in diameter distally to about diameter of segment 1, segments 3 and 4 subequal in diameter, slightly greater than distal diameter of segment 2; pronotal collar slightly wider than diameter of antennal segment 1; posterior margin of pronotum nearly straight across mesoscutum, convex laterally; cuneal fracture angled anteromedially; abdomen reaching almost to apex of cuneus.

MEASUREMENTS: Total length 4.08, maximum width 1.04, length head .48, width head .76, interocular space .32, length pronotum .68, width pronotum 1.04, length scutellum .56, width scutellum .68, length corium 1.96, length clavus 1.12, length cuneus .68, width cuneus .32, length claval commissure .76, distance apex commissure-apex membrane 1.60, length metatibia 1.60; length antennal segments 1—.22, 2—.90, 3—.56, 4—.43; length labial segments 1—.34, 2—.36, 3—.36, 4—.36.

MALE GENITALIA: Figures 151-153.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH WEST AFRICA: Abachaus, Otjiwarongo District, III.1950, G. Hobohm (TM).

This species is named for the collector, G. Hobohm.

Carinogulus hobohmi is most closely related to *C. transvaalensis* by the posteriorly convex head, parallel sided hemelytral maculae, and the structure of the male genitalia, in which the phallosome lacks the thumb-like process found in the other two species in the genus. *C. hobohmi* can be separated from *transvaalensis* by the form of the hemelytral maculae, which are offset in the former (Figure 25) but form an uninterrupted fascia in the latter.

An additional specimen of *Carinogulus* from 10 miles south

of Okaukeujo, South West Africa, collected on May 14, 1958, at 1100 meters elevation, deposited in the California Academy of Sciences, resembles *hobohmi* rather closely in the form of the head and body, but differs in that the hemelytral maculae are irregular. This specimen may represent a new species.

***Carinogulus kochi*, new species**

Figures 26, 158, 159

MACROPTEROUS MALE: Basic coloration bright brownish orange; antennal segments 2, 3, and 4 (except as below), extreme apex of corium, cuneus, cell of membrane, and genital capsule castaneous; membrane smoky brown; distal end of antennal segment 1, bases of antennal segments 3 and 4, ostiolar peritreme, and incomplete transverse maculae on clavus and corium white (Fig. 26); hemelytral maculae outlined in castaneous; metacoxae and metatrochanters light; all tarsi lighter than tibiae.

Surface texture, vestiture, and structure as in *C. varii* except vertex weakly convex and without distinct longitudinal sulcus.

MEASUREMENTS: Total length 4.48, greatest width ?, length head .46, width head .86, interocular space .32, median length pronotum .72, width pronotum 1.18, length scutellum .60, width scutellum .80, length corium 2.00, length clavus 1.66, length cuneus .62, width cuneus .38, length claval commissure .96, distance apex commissure-apex membrane 1.70, length metatibia 2.10; length antennal segments 1—.34, 2—1.14, 3—.76, 4—.54; length labial segments 1—.36, 2—.48, 3—?, 4—?.

MALE GENITALIA: Figures 158, 159.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Alexandersbay, 9.XII.48, Koch/Son (TM).

See discussion under *C. varii*.

***Carinogulus transvaalensis*, new species**

Figures 147–150

MACROPTEROUS MALE: Very similar in coloration and structure to *C. hobohmi*; basic color deep castaneous, legs somewhat lighter than body; antennal segments 1 and 2 light brown, segment 2 cream on distal half; protarsi and mesotarsi light (metatarsi missing in holotype), contrasting with dark tibiae; anterior half of clavus dull as in *hobohmi* but unicolorous with remainder of hemelytra; corium and clavus with complete white transverse fascia situated at level

of anterior third of claval commissure, slightly wider laterally than mesially, not reaching lateral corial margin (only anterior half of left hemelytron present in holotype); metafemora club-like, slightly more swollen on distal half than in *hobohmi*; protibiae and mesotibiae with only a very few, short, semierect spines on ventral surfaces; metatibiae mutic.

MEASUREMENTS: Total length ?, maximum width ?, length head .48, width head .84, interocular space .36, length pronotum .80, width pronotum 1.08, length scutellum .48, width scutellum .60, length corium 1.80, length clavus 1.40, length cuneus ?, width cuneus ?, length claval commissure .84, distance apex commissure-apex membrane ?, length metatibia 1.72; length antennal segments 1—.24, 2—.92, 3—.60, 4—?; length labial segments 1—.36, 2—.32, 3—.36, 4—.42.

MALE GENITALIA: Figures 147–150.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Blouberg, Leipzig Miss. Stat., 3–5.I.1955, Trans. Mus. Exp. (TM).

This species is named for its occurrence in the Transvaal.

Carinogulus transvaalensis can be recognized by its castaneous coloration and the complete white transverse fascia of nearly uniform width just anterior to the middle of the claval commissure (see also discussion under *C. hobohmi*).

***Carinogulus varii*, new species**

Figures 154–157

MACROPTEROUS MALE: Generally castaneous, including antennae and legs, except as noted below (antennal segments 3 and 4 missing in holotype); incomplete transverse maculae on clavus and corium and ostiolar peritreme white; all tarsi and metacoxae light brown; membrane dark smoky brown with a white “halo” basally.

Median third of clavus and corium (anterior posterior orientation) dull, tomentose, remainder polished, shining; scutellum, clavus, and corium with a few long, fine, erect hairs.

Head weakly convex behind eyes, forming short neck about as long as diameter of antennal segment 2 and as wide as vertex between eyes; vertex slightly depressed between eyes and with distinct median longitudinal sulcus anteriorly; antennal segment 1 slightly enlarged, segment 2 tapering proximally, distal diameter about equal to diameter of segment 1, segments 3 and 4 subequal to distal diam-

eter of segment 2; labium slightly surpassing mesocoxae; posterior margin of pronotum straight across mesoscutum, convexly rounded laterally; metatarsal segments 1 and 2 subequal in length, segment 3 about $1\frac{1}{2}$ times length of segment 2.

MEASUREMENTS: Total length 4.80, maximum width 1.04, length head .60, width head .92, interocular space .30, length pronotum .84, width pronotum 1.12, length scutellum .44, width scutellum .56, length corium 2.08, length clavus 1.60, length cuneus .60, width cuneus .40, length claval commissure .92, distance apex commissure-apex membrane 1.92, length metatibia 2.32; length antennal segments 1—.28, 2—1.40, 3—?, 4—?; length labial segments 1—.42, 2—.40, 3—.40, 4—.40.

MALE GENITALIA: Figures 154–157.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH WEST AFRICA: Farm DJAB, Rehoboth Dist., 7.V.1959, L. Vari (TM).

This species is named for the collector, Dr. L. Vari, Curator of Insects at the Transvaal Museum, Pretoria.

Carinogulus varii is most closely related to *C. kochi*. Both species have the head convex behind, have a few erect, long hairs on the scutellum and hemelytra, a somewhat irregular fascia, a short apical spine on the vesica, and a thumb-like projection on the phalotheca. *C. varii* is uniformly castaneous as opposed to *kochi* which is bright brownish orange. The eyes of *varii* are slightly larger and more protuberant than those of *kochi*, but without both species for comparison, this character is difficult to use (see also key to species of *Carinogulus*).

Formicopsella Poppius

Formicopsella Poppius, 1914a, pp. 42–43.

Formicopsella is closely related to *Sohenus* Distant from India and to *Myombea* and *Skukuza* from Africa, especially by the structure of the head. The genus can be recognized by the eyes being removed from the anterior margin of the pronotum by a distance nearly equal to the diameter of an eye, the antennae inserted at about the middle of the anterior margin of the eyes, and the absence of a spine on the scutellum. The pattern of coloration is very similar to all of the above mentioned genera and to *Pangania*, with a complete, transverse, hourglass-shaped, white fascia medially on the corium and a transverse white macula at the apex of the corium along the cuneal fracture.

Formicopsella regneri Poppius

Figures 38, 160–162

Formicopsella regneri Poppius, 1914a, p. 43.

As the only described species in the genus (see however *Skukuza zeugma*), *Formicopsella regneri* can be recognized by the characters noted in the generic discussion. Poppius (1914a) stated that the dorsum of *regneri* possessed only decumbent white hairs, whereas in fact the dorsum and genae have scattered, erect, white hairs about as long as the protibial diameter, in addition to the decumbent hairs. This omission by Poppius was apparently the result of the rubbed condition of the holotype. Poppius also noted that the labium reached almost to the "spitze" of the metacoxae. In specimens from South Africa the labium reaches the posterior margin of the mesosternum in macropterous males and is slightly shorter in brachypterous females. Poppius may have experienced difficulty in determining the exact length of the labium relative to the body because the head is flexed forward in the card-mounted holotype.

Although *regneri* was described from a macropterous female, all female specimens known from South Africa are brachypterous. The general structure of the brachypterous forms is similar to that of the macropterous males and females except that the pronotum is less steeply inclined posteriorly and the hemelytra are undifferentiated and cover only about the basal third of the abdomen.

MEASUREMENTS: macropterous ♂—Total length 4.44, maximum width 1.24, width head .88, interocular space .40; brachypterous ♀—Total length 4.68, maximum width 1.00, width head .96, interocular space .54.

MALE GENITALIA: Figures 160–162.

The host of this arboreal species is *Acacia karroo* Hayne (see also discussion under *Pangania fasciatipennis*).

SPECIMENS EXAMINED: *Cape Province*—11 macropterous ♂♂, Kimberley, 17–18 Jan. 1968, UV light. *Natal*—2 brachypterous ♀♀, Estcourt; 1 macropterous ♂, Eshowe, 15 Nov. 1967; 1 macropterous ♂, Weenen, i.ii.1928 (Thomasset). *Transvaal*—1 brachypterous ♀, 1 nymph, Malips Drif, 8.12.65 (Hoffman); 1 macropterous ♂, Middelfontein near Nylstroom, XII-17-1953 (Capener); 5 nymphs (in alcohol), 1.7 mi. N. Mooketsi, 13 Dec. 1967; 2 macropterous ♂♂, Moorddrift, 12.1914 (Swierstra); 10 macropterous ♂♂, 14 brachypterous ♀♀ (in alcohol—4 macropterous ♂♂, 2 brachypterous ♀♀, 11 nymphs), Pienaarsriver Dam, 15 mi. NE Pretoria, 2 November 1967 (Adults and nymphs on *Acacia*

karroo Hayne) (SANC, TM, BM[NH], HM, JAS, RTS). TANZANIA—Daressalam, Pangani, 10-30-09 (Regner) (holotype) (HM).

Hallodapus Fieber

Hallodapus Fieber, 1858, p. 307—Odhiambo, 1959c, pp. 667–668.

Hallodapus can be characterized as follows—

Small, ant mimetic; males usually macropterous, females sometimes brachypterous; coloration variable, usually with complete or incomplete white transverse fascia on anterior half of hemelytra and white quadrate macula at lateral apex of corium; legs variable in color, never completely dark; vestiture of short decumbent or long erect hairs or a combination of the two types; vertex weakly longitudinally sulcate or not; eyes granular, with or without short, erect hairs, contiguous with anterior margin of pronotum, protuberant, slightly larger in males than females; antennae long, segment 1 slightly enlarged, segment 2 linear, slightly greater in diameter than segments 3 and 4, slightly less than segment 1; pronotal collar flat, wide; pronotum steeply inclined posteriorly in macropterous forms, only slightly inclined in brachypterous forms; hemelytra parallel sided, at most weakly sinuate laterally; membrane with two cells, smaller cell sometimes obsolete; tibiae occasionally with very long thin spines; parempodia hair-like, parallel; pulvilli minute.

MALE GENITALIA: Figures 163–177. Vesica usually very long, with several bends; phallosome L-shaped, usually simple and tubular, sometimes with dorsal projection; left clasper trough-like; right clasper lanceolate.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

Hallodapus is closely related to *Trichophthalmocapsus*, *Boopidella*, and *Laemocoris*. *Hallodapus transvaalensis*, described as new below, is particularly closely related to *Trichophthalmocapsus* and *Laemocoris* by virtue of its having a wing edge stridulatory mechanism (see discussion of structure under *Trichophthalmocapsus*), a character which is common to all known species of those genera. Other species of *Hallodapus* which have the wing edge stridule are: *H. discriminatus* (Distant), *H. maculatus* (Distant), *H. montandoni* (Reuter), *H. dispar* (Odhiambo), *H. poseidon* (Kirkaldy) and *H. rufescens* (Burmeister). The remaining species of *Hallodapus* do not have the wing edge stridulatory mechanism. The following species, however, have not been examined for the structure: *H. brunneus* (Poppius), *H. centrimaculatus* (Poppius), *H. indicus* Poppius, *H. persimilis* Poppius, *H. pumilis* Horvath, *H. ravenar* Poppius, and *H. sibiricus* Poppius.

The males of *Hallodapus* are very similar to those of *Laemocoris*, except that in the latter genus the scutellum is usually swollen and forms a spine-like projection, and in the former the scutellum is nearly flat. The females of *Hallodapus* are usually brachypterous, the hemelytra being undifferentiated and covering about half of the abdomen; the pronotum is much less steeply inclined posteriorly than in the macropterous forms. The brachypterous females of *Laemocoris* usually have the pronotum strongly swollen.

Hallodapus is widespread in the Old World, occurring primarily in tropical regions. A single species has been recorded from the New World (Carvalho, 1958a); it is, however, not a species of *Hallodapus*, but belongs to the Bryocorinae, as I have confirmed by examination of the holotype of *Eritocoris albiceps* Lethierry in the Brussels Museum. *Eritocoris* is a junior synonym of *Hallodapus* and therefore *albiceps* will have to be placed in another existing genus or in a new genus. This action, however will have to await study of *albiceps* by a specialist of the Bryocorinae.

All species of *Hallodapus* for which field data are available are ground living. The males of all African species are known only from macropterous forms, but Southwood and Leston (1958) note that *H. rufescens* in Great Britain is generally brachypterous in both sexes.

List of species of *Hallodapus* from Africa

albofasciatus Motschulsky (*Leptomerocoris*), 1863, p. 86.

Widely distributed in Africa and Orient.

* *chariensis* Odhiambo (*Trichophthalmocapsus*), see *albofasciatus* (Motschulsky) **New Synonymy.**

discoidalis Poppius (*Plagiorhamma*), 1914a, p. 56.
Tanzania.

dispar Odhiambo (*Azizus*), 1959c, pp. 668–670. **New Combination.** Uganda.

pilosa Reuter (*Plagiorhamma*), 1882, p. 31. Guinea.

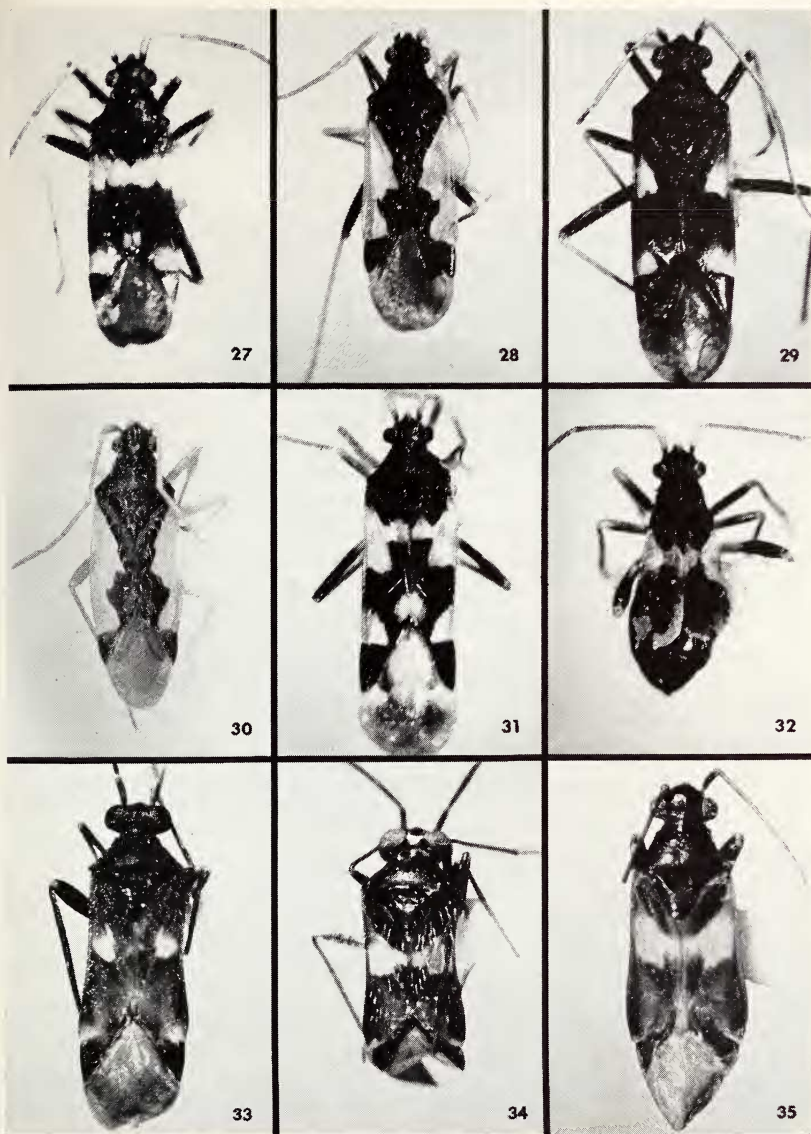
poseidon Kirkaldy (*Laemocoris*), 1902b, p. 315. Guinea.

pseudosimilis new species. South Africa: Transvaal.

quadrinaculatus new species. South Africa: Transvaal.

→

FIGS. 27–35. Hallodapini. Fig. 27. *Hallodapus albofasciatus*, male (Pretoria, Transvaal). Fig. 28. *Hallodapus pseudosimilis*, male, holotype. Fig. 29. *Hallodapus quadrinaculatus*, male, holotype. Fig. 30. *Hallodapus similis*, female (Pretoria, Transvaal). Fig. 31. *Hallo-*



dapus transvaalensis, male, holotype. Fig. 32. *Hallodapus transvaalensis*, female (5 mi N. Louis Trichardt, Transvaal). Fig. 33. *Trichophthalmocapsus australis*, male, holotype. Fig. 34. *Trichophthalmocapsus hessei*, male, holotype. Fig. 35. *Trichophthalmocapsus hessei*, female (Warmbad, South West Africa).

* *reuteri* Poppius (*Tyraquellus*), see *albofasciatus* (Motschulsky) **New Synonymy.**

similis Poppius (*Plagiorhamma*), 1914a, p. 55. East Africa; South Africa: Transvaal.

* *tenuis* Odhiambo (*Hallodapus*), see *albofasciatus* (Motschulsky) **New Synonymy.**

transvaalensis, new species. South Africa: Natal, Transvaal.

verticicus Odhiambo (*Hallodapus*), 1967, pp. 1671–1673. Central African Republic.

vittatus Odhiambo (*Trichophthalmocapsus*), 1959c, pp. 661, 663–664, 685. **New Combination.** Uganda; Abyssinia.

KEYS TO SOUTH AFRICAN SPECIES OF *Hallodapus*

Macropterous specimens

1. Exocorium entirely cream or white 2
Exocorium not entirely cream or white 3
2. Metafemora entirely cream or white *similis* (Fig. 30)
Metafemora cream or white on proximal third, castaneous on distal two-thirds *pseudosimilis* (Fig. 28)
3. Hemelytra without complete white transverse fascia
..... *quadrimaculatus* (Fig. 29)
Hemelytra with complete white transverse fascia, femora not entirely castaneous 4
4. White transverse fascia of nearly uniform width
..... *albofasciatus* (Fig. 27)
White transverse fascia wide on corium, narrow on clavus
..... *transvaalensis* (Fig. 31)

Brachypterous specimens

1. Posterior margins of hemelytra almost entirely white
..... *transvaalensis* (Fig. 32)
Posterior margins of hemelytra almost entirely castaneous
..... *albofasciatus*

***Hallodapus albofasciatus* (Motschulsky)**

Figures 27, 163–165

Leptomerocoris albofasciatus Motschulsky, 1863, p. 86.

Tyraquellus reuteri Poppius, 1914a, pp. 51–52. **New Synonymy.**

Hallodapus tenuis Odhiambo, 1959c, pp. 664–668, 685. **New Synonymy.**

Trichophthalmocapsus chariensis Odhiambo, 1967, pp. 1678–1681.

New Synonymy.

Hallodapus albofasciatus in South Africa can be recognized by the long, light colored, nearly erect pubescence on the dorsum, the

conspicuous erect hairs on the eyes, the yellow antennae (except the proximal half of segment 1 which is brown), the yellow tibiae, the light colored mesocoxae and metacoxae and proximal third of the mesofemora and metafemora, the complete, broad, "jagged-edged," white, transverse hemelytral fascia, and the more or less quadrangular macula on the corium at the cuneal fracture.

MALE GENITALIA: Figures 163–165.

H. albofasciatus differs from *H. similis* and *H. pseudosimilis* in that the exocorium is not entirely light and the eyes are hairy, from *transvaalensis* in that the transverse fascia of the hemelytra is nearly uniformly broad whereas in *transvaalensis* it is broad on the corium and narrow on the clavus, and from *quadrimaculatus* which does not have a complete transverse fascia and has only short decumbent pubescence dorsally.

Hallodapus albofasciatus has been recorded previously from Ceylon, Java, and Madagascar (Carvalho, 1958a). Comparison of specimens from Southeast Asia and northern and southern Africa indicates that indeed only a single very widespread species is involved. Study of specimens in the British Museum (Natural History) identified by Linnavuori as *Hallodapus reuteri* (Poppius), and of the original description of *reuteri*, indicates that it is synonymous with *albofasciatus* and by priority must bear the latter name. Examination of the holotype of *Trichophthalmocapsus chariensis* Odhiambo in the Paris Museum indicates that it is also synonymous with *albofasciatus* and must bear the latter name by priority. *Hallodapus scotti* (China) from Rodriguez Island, is very similar to *albofasciatus* and its distribution would support the contention that the 2 may be synonymous. This species is at present known only from a brachypterous female, and therefore a decision on formal synonymy will have to await comparison of the genitalia when males become available. Also, examination of the holotype of *Hallodapus tenuis* Odhiambo in the British Museum (Natural History) reveals that this species is a synonym of *albofasciatus* and must bear the latter name by priority.

The type specimen of *Hallodapus albofasciatus* was recorded as destroyed by Bergroth (1917), and therefore it seems desirable to designate a neotype. Distant (1904c) recorded this species from Ceylon as *Tyraquellus albofasciatus*. The specimens examined by Distant agree substantially with the original description of Motschulsky (1863) and are from Ceylon. I have selected a male as the neotype. It bears the following labels: "Ceylon (Green)";

"Distant Coll. 1911-383"; and "NEOTYPE *Leptomerocoris albofasciatus* Motschulsky, det. R. T. Schuh". It is deposited in the British Museum (Natural History).

Hallodapus albofasciatus is ground living. Two specimens from 15 mi. NE of Machododorp, Transvaal, were taken under *Ac-anthospermum australe* (Loefl.) Kuntze (Compositae).

SPECIMENS EXAMINED: *Natal*—1 macropterous ♂, P. Town; 1 macropterous ♂, St. Lucia Estuary, 14 Nov. 1967. *Orange Free State*—1 macropterous ♂, Emmaus. *Transvaal*—1 macropterous ♀, 10 mi. E. Machododorp, 30 Nov. 1967, at light; 1 macropterous ♂, 1 macropterous ♀, 1 brachypterous ♀, 15 mi. NE Machadodorp, 4500 ft. elevation, 26-27 Mar. 1968; 1 macropterous ♀, Lyttleton, 12 Jan. 1968, UV light; 1 macropterous ♂, Pretoria, 2 Nov. 1967, at light; 1 macropterous ♂, Pretoria, 14.1.06; 1 macropterous ♂, Pretoria, 18.1.06; 1 macropterous ♂, Pretoria, 23.1.07 (Janze); 1 macropterous ♂, South Africa, B.M. 1926-40 (SANC, TM, BM[NH], JAS, RTS).

***Hallodapus pseudosimilis*, new species**

Figures 28, 166-168

Hallodapus similis Carvalho, Dutra, and Becker, 1960 (*nec* Poppius), pp. 454-455.

MACROPTEROUS MALE: Elongate, nearly parallel sided; head, pronotum, and scutellum nearly black; proximal third of antennal segment 1, distal half of metafemora, most of clavus, inner apical portion of corium, cuneus, and thoracic pleura castaneous; exocorium, anterior half of endocorium, and anterior half of lateral claval margin white; membrane generally smoky brown, white at apex of cuneus; all coxae, femora (except as above), and tibiae, ostiolar peritreme, and labium cream; tarsi cream proximally, brown distally; abdomen brownish basally, grading to castaneous apically.

Body surface dull; dorsum, particularly head, pronotum, and scutellum, with scattered, decumbent, short, sericeous hairs and moderately long, semierect, shining hairs; inner surface of antennal segment 1 with a few, erect, fine spines about the length of segmental diameter; antennal segments 2, 3, and 4 with very short, appressed, shining pubescence; abdominal venter with reclining light hairs; femora with decumbent hairs and very slender long hairs ventrally.

Frons strongly convex; vertex broad, nearly flat, not sulcate, posterior margin slightly concave and with very fine, raised carina;

eyes protuberant, contiguous with anterior margin of pronotum, not reaching gula; clypeus visible from above; antennae inserted just above ventral margin of eyes; fossae slightly removed from eyes; antennal segment 1 only slightly enlarged, segment 2 of slightly greater diameter distally than proximally, segments 3 and 4 about two-thirds diameter of segment 2; pronotum elevated posteriorly, lateral margins very shallowly concave, posterior margin weakly sinuate, calli indistinct; mesoscutum exposed, elevated above hemelytra, inclined anteriorly, separated from scutellum by a distinct transverse impression; scutellum convex; hemelytra nearly parallel sided; membrane with only one visible cell, inner vein nearly parallel to mesial margin of cuneus; cuneus inset from corial margin by distance equal to about diameter of antennal segment 1; cuneal fracture slightly angled anteromedially; abdomen just surpassing base of cuneus; tibiae with a few semierect, light spines about as long as tibial diameter; metatarsal segment 1 about half length of segment 2, segment 2 subequal in length to segment 3.

MEASUREMENTS: Total length 3.20, maximum width 1.04, length head .26, width head .48, interocular space .23, length pronotum .34, width pronotum .90, length scutellum .50, width scutellum .64, length corium 1.48, length clavus 1.08, length cuneus .42, width cuneus .26, length claval commissure .58, distance apex commissure-apex membrane 1.46, length metatibia 1.44; length antennal segments 1—.30, 2—.84, 3—.78, 4—.48; length labial segments 1—.32, 2—.32, 3—.26, 4—.38.

MALE GENITALIA: Figures 166–168.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, 30 Nov. 1967, 10 mi. E. Machadodorp, J. A. & S. Slater, T. Schuh, at light (SANC).

PARATYPES: *Transvaal*—1 macropterous ♂, Lyttelton, 18 Dec. 1967, at light; 1 macropterous ♂, *idem*, 22 Dec. 1967, UV light; 2 macropterous ♂♂, *idem*, 27 Dec. 1967, UV light; 1 macropterous ♂, Waterkloof Ridge, Pretoria, 9.4.54, at light in evening (Rudebeck); 1 macropterous ♂, Pretoria, 10.XI.1957 (Vari); 1 macropterous ♂, *idem*, 23.12.1959, light trap (Neubecker); 1 macropterous ♂, *idem*, 6 Nov. 1967, at light; 3 macropterous ♂♂, *idem*, 7 Nov. 1967, at light (SANC, TM, LU, JAS, RTS).

This species is named for its similarity to *Hallodapus similis*. See discussion under *H. similis*.

No biological information is available for this species. All known

specimens are from the highveld of the Transvaal and were taken at lights.

***Hallodapus quadrimaculatus*, new species**

Figures 29, 169–171

MACROPTEROUS MALE: Elongate, parallel sided; basic coloration black or brownish black; antennal segment 1 proximally, labial segments 1 and 2, prothoracic and mesothoracic pleura, procoxae and mesocoxae, all femora, and all of tarsal segment 3 castaneous; quadrate maculae on anterior half of corium and at apex of corium, white; distal two-thirds of antennal segment 1, antennal segments 2, 3, and 4, metacoxae, all tibiae, and all tarsal segments 1 and 2 yellowish or light brown; labial segments 3 and 4 brown; membrane generally smoky brown; cells of membrane somewhat darker than surrounding membrane.

Abdominal venter polished, shining, remainder of body finely granulose, dull; dorsum with short decumbent light hairs; antennal segment 1 with light, very fine, erect spine on interior surface, segments 2, 3, and 4 with very short, fine, decumbent pubescence; abdominal venter with short, reclining, shining hairs; femora with very fine, short, appressed hairs and some long erect hairs on ventral surface; tibiae with very fine decumbent pubescence, a few short semierect spines no longer than tibial diameter, and longitudinal rows of tiny, closely spaced spines.

Head declivent; eyes moderately large, protuberant, leaving genae exposed ventrally; vertex flattened, not sulcate, posterior margin with fine raised carina; antennal segment 1 moderately enlarged, segment 2 about two-thirds diameter of segment 1, segments 3 and 4 subequal in diameter, of slightly smaller diameter than segment 2; bucculae weakly developed; gula short; labial segment 1 reaching onto prosternum, labium reaching apex of metacoxae; pronotal collar almost as wide as diameter of antennal segment 1; calli obsolete; pronotum with lateral margins shallowly concave, posterior margin sinuate, shallowly concave across mesoscutum; mesoscutum exposed, raised, inclined anteriorly, separated from scutellum by distinct transverse impression; scutellum convex; cuneal incisure obsolete, cuneal fracture angled slightly anteromedially; membrane with 2 cells, vein demarcating smaller cell obscure; abdomen reaching middle of cuneus; metatarsal segment 1 half length of segment 2, segment 2, subequal in length to segment 3.

MEASUREMENTS: Total length 3.72, maximum width 1.12, length head .28, width head .65, interocular space .24, length pronotum .38, width pronotum 1.02, length scutellum .62, width scutellum .80, length corium 1.80, length clavus 1.38, length cuneus .62, width cuneus .26, length claval commissure .72, distance apex commissure-apex membrane 1.60, length metatibia 1.90; length antennal segments 1—.32, 2—1.04, 3—.98, 4—.72; length labial segments 1—.40, 2—.40, 3—.40, 4—.40.

MALE GENITALIA: Figures 169–171.

MACROPTEROUS FEMALE: Very similar to male.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Pretoria, 4 Dec. 1967, J. A. & S. Slater, T. Schuh, at light (SANC).

PARATYPES: *Transvaal*—1 macropterous ♂, Pretoria, 10.XI. 1957 (Vari); 2 macropterous ♂♂, Pretoria, 6 Nov. 1967, at light; 11 macropterous ♂♂, 3 macropterous ♀♀, Pretoria, 7 Nov. 1967, at light; 1 macropterous ♂, Pretoria, 23 Nov. 1967, at light; 2 macropterous ♂♂, 1 macropterous ♀, Pretoria, 26 Dec. 1967, at light (Sweet); 1 macropterous ♂, Lyttleton, 27 Dec. 1967, UV light (SANC, TM, HM, JAS, RTS).

This species is named for its possession of four quadrate maculae on the hemelytra.

Hallodapus quadrimaculatus is the only South African species of the genus that has only short decumbent dorsal pubescence and four quadrate hemelytral maculae. It is probably most closely related to *Hallodapus poseidon* but is larger and has the procoxae and mesocoxae completely castaneous whereas they are almost totally light brown or cream in *poseidon*.

H. quadrimaculatus is known only from Pretoria and all specimens are from lights.

A macropterous female from Warmbaths, Transvaal, deposited in the J. A. Slater Collection, resembles *quadrimaculatus* in general coloration, but has long erect as well as short appressed dorsal pubescence. Two brachypterous females from Oliviershoek Pass Summit, Natal, deposited in the J. A. Slater Collection, resemble the above specimen closely in pattern of coloration and vestiture and may be conspecific with it. A macropterous female from Satara Camp, Kruger National Park, Transvaal, deposited in the J. A. Slater Collection, has a color pattern similar to *quadrimaculatus* but the white maculae on the anterior half of the corium extend slightly onto the clavus; the dorsal vestiture is composed only of long erect hairs.

Hallodapus similis (Poppius)

Figures 30, 172-174

Plagiorhamma similis Poppius, 1914a, p. 55.*Hallodapus similis* Odhiambo, 1959c, p. 667.

Hallodapus similis is one of four species of *Hallodapus* in Africa which has the exocorium entirely white; *H. suturalis* (Fieber) (incorrectly attributed to Herrich-Schaeffer by Carvalho, 1958a), from the Palearctic, is the only other species in the genus with this pattern of coloration. *H. similis* can be separated from *H. pseudosimilis*, the only other South African species of *Hallodapus* with a completely white exocorium, by virtue of its having completely white metathoracic pleura and metafemora whereas *pseudosimilis* has the metafemora castaneous distally and white proximally and has the metathoracic pleura castaneous.

Although *similis* and *pseudosimilis* appear to be very closely related on general facies, the structure of the male genitalia in the two species is quite different. The phallosome in *similis* (Fig. 173) has a dorsal projection similar to the type found in *Pangania fasciatipennis*; this structure is not found in any other known species of *Hallodapus* for which the male genitalia have been examined. The phallosome of *pseudosimilis* (Fig. 168) is similar to that found in *H. transvaalensis* and *H. albofasciatus*. The vesica of *similis* (Fig. 172) is twisted and S-shaped, whereas in *pseudosimilis* the vesica is bent in a more complex fashion (Fig. 166), much like it is in *transvaalensis* and *quadrimaculatus*. This complex genitalic picture points up the need for much further study of the phyletic relationships within the Hallodapini.

No biological or ecological data are available for this species. It is known only from Pretoria and is sympatric with *pseudosimilis*.

SPECIMENS EXAMINED: *Transvaal*—1 macropterous ♀, Pretoria, 10.XI.1957 (Vari); 4 macropterous ♀♀, Pretoria, 7 Nov. 1967, at light; 1 macropterous ♂, 1 macropterous ♀, Pretoria, 4 Dec. 1967, at light (SANC, TM, RTS).

Hallodapus transvaalensis, new species

Figures 31-32, 175-177

MACROPTEROUS MALE: Very elongate, parallel sided; basic coloration castaneous; anterior half of corium, except extreme base, transverse fascia on clavus, quadrate macula at apex of corium, round macula between apex of claval commissure and base of mem-

brane, distal four-fifths of antennal segment 1, ostiolar peritreme, distal four-fifths of procoxae and mesocoxae, entire metacoxae, and proximal third of metafemora white; proximal fifth of antennal segment 1, distal two-thirds of metafemora, and abdomen castaneous; thoracic pleura and venter dark brown to black; labial segment 1 and proximal fifth of procoxae and mesocoxae reddish; antennal segments 2, 3, and 4, labial segments 2, 3, and 4, profemora and mesofemora, all tibiae, and all tarsal segments light brown; apical two-fifths of membrane and apices of cells smoky brown, remainder of membrane almost white.

Head pronotum, scutellum, and thoracic pleura finely granular, dull; hemelytra smooth, dull to weakly shining; abdominal venter polished, shining; entire dorsum with numerous, very long, erect or semierect, sericeous hairs; antennal segment 1 with a few long, semierect, slender spines on interior surface, all segments with rather dense vestiture of reclining light hairs of length about equal to diameter of segment on which they occur; abdomen with numerous, long, semierect, light hairs; all femora and tibiae with short, decumbent, light hairs and long, fine, light, spine-like hairs (many about twice the length of tibial diameter of leg on which they occur); eyes with short hairs.

Head declivent; eyes protuberant; vertex broad, posterior margin with fine raised carina; vertex and frons convex; clypeus visible from above, compressed laterally; antennae inserted just below middle of anterior margin of eyes; antennal segment 1 only slightly enlarged, segment 2 about two-thirds diameter of segment 1, segments 3 and 4 of slightly smaller diameter than segment 2; bucculae weakly developed; gula short; labial segment 1 reaching onto prosternum, labium reaching onto anterior third of abdomen; pronotum steeply inclined, posterior and lateral margins nearly straight; calli obsolete; mesoscutum exposed, elevated, separated laterally from scutellum by distinct impression, impression obsolete medially; scutellum weakly convex; hemelytra parallel sided, lateral margins with obscure finely serrate stridulitrum; cuneal incisure obsolete, cuneal fracture perpendicular to lateral corial margin; membrane with two distinct cells, inner vein nearly parallel to mesial margin of cuneus; abdomen not quite reaching apex or corium; legs moderately long; inner surface of metafemora glabrous, with coarse granular texture (stridulatory plectrum); all tibiae with longitudinal rows of tiny, closely spaced spines; metatarsal segment 1 about half length segment 2, segment 2 subequal in length to segment 3.

MEASUREMENTS: Total length 3.64, maximum width 1.04, length head .24, width head .54, interocular space .26, length pronotum .38, width pronotum .94, length scutellum .50, width scutellum .64, length corium 1.68, length clavus 1.30, length cuneus .54, width cuneus .26, length claval commissure .66, distance apex commissure-apex membrane 1.72, length metatibia 1.60; length antennal segments 1—.32, 2—1.10, 3—.80, 4—?; length labial segments 1—.34, 2—.36, 3—.30, 4—.40.

MALE GENITALIA: Figures 175–177.

BRACHYPTEROUS FEMALE: Basic coloration, body surface texture, and vestiture as in macropterous male (Fig. 32).

Head very similar in structure to male, eyes somewhat smaller; antennae inserted slightly above ventral margin of eyes, fossae removed from inner margin of eyes by distance equal to about diameter of antennal segment 2; pronotum only slightly inclined posteriorly, lateral margins sinuate, posterior margin deeply excavated medially; mesoscutum and scutellum nearly flat; hemelytra undifferentiated, reaching just posterior to middle of abdomen, lateral margins nearly straight, posterior margins evenly rounded; abdomen greatly enlarged in gravid females, pointed apically.

MEASUREMENTS: Total length 3.20, maximum width 1.12, width head .58, interocular space .28.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Zoutpansberg, 4500 ft., 5 mi. N. Louis Trichardt, 8 May 1968, T. Schuh, J. A. & S. Slater, M. Sweet (SANC).

PARATYPES: *Natal*—2 brachypterous ♀♀, 5 mi. N. Umkomaas, 17 Apr. 1968. *Transvaal*—1 macropterous ♂, 1 brachypterous ♀, Barberton, 3000 ft., 22–23 Mar. 1968; 1 macropterous ♂, Lyttelton, 27 Feb. 1968, UV light; 1 macropterous ♂, 20 mi. NE Machadodorp, Schoemanskloof, 4300 ft., 22 Mar. 1968; 1 macropterous ♂, Pretoria, 10.3.07 (Janse); 1 macropterous ♂, Pretoria, 17.I.1951 (Vari); 3 macropterous ♂♂, 1 macropterous ♀, 11 brachypterous ♀♀, same data as holotype; 2 macropterous ♂♂, South Africa, BM, 1926–40 (SANC, TM, BM[NH], JAS, RTS).

Hallodapus transvaalensis can be separated from all other described species of *Hallodapus* by its peculiar hemelytral fascia (Fig. 31). This is the only South African species of *Hallodapus* which possesses a stridulatory mechanism and the very long tibial spines.

H. transvaalensis is ground-living. The series of specimens from Louis Trichardt was taken from a dry grassy area along a roadside.

NOTES ON EXTRALIMITAL SPECIES

Hallodapus dispar (Odhiambo), new combination

Azizus dispar Odhiambo, 1959c, pp. 668–670.

This species was described in the genus *Azizus* from Uganda. The presence of well demarcated contrasting hemelytral maculae, the absence of the erect peg-like hairs which are characteristic of other *Azizus* species, the absence of extreme sexual dimorphism of the eyes, and the presence of a wing edge stridulatory mechanism, militate against placement of *dispar* in *Azizus*, but argue rather for placement in *Hallodapus*. Careful study of the *Hallodapus* complex of genera may reveal that *dispar* will need to be placed in a new genus.

Hallodapus poseidon (Kirkaldy)

Laemocoris poseidon Kirkaldy, 1902b, p. 315.

Poppius (1914a) synonymized *Allodapus aethiopicus* Reuter with *Laemocoris* (= *Hallodapus*) *poseidon* Kirkaldy. The holotype of *H. poseidon* from Addah (Ghana) is in the Helsinki Museum (Type No. 11866). Also what is probably the type of *H. aethiopicus*, from Pemba Island, is in the Helsinki Museum (Type No. 12071). The latter specimen is missing the head and pronotum but from what is available the specimen does not appear to be conspecific with *poseidon*. Confirmation of this, however, will have to await a revision of *Hallodapus*.

Hallodapus vittatus (Odhiambo), new combination

Trichophthalmocapsus vittatus Odhiambo, 1959c, pp. 661–664, 685.

This species was described in *Trichophthalmocapsus* but cannot be satisfactorily placed there because it does not have a wing edge stridulatory mechanism, lacks the very long spines on the tibiae, and has a nearly straight lateral corial margin. I am tentatively placing *vittatus* in *Hallodapus* even though it may deserve placement in a separate genus, but this cannot be determined without a revision of the *Hallodapus* complex of genera.

Laemocoris Reuter

Laemocoris Reuter, 1879, p. 183.

Laemocoris can be recognized by the possession of a *Hallodapus*-like facies, long erect hairs on the dorsum, a wing edge stridulatory

mechanism, strong sexual dimorphism, and a tumid scutellum which is usually spine-like in the males.

This genus is most diverse in the Mediterranean and Middle East, but it ranges through Africa and probably occurs in Southeast Asia (Carvalho, 1958a). *Laemocoris* presently includes about 11 described species. The fauna from the Middle East has been reviewed by Linnavuori (1964).

Only a single brachypterous female of an unidentified *Laemocoris* species is known from South Africa. It bears the following data and is placed in the J. A. Slater Collection: "S. Africa: Cape Prov., Cape Point Nat. Res., 22 Jan. 1968, J.A.&S. Slater, T. Schuh, M.H. Sweet."

***Myombea* China and Carvalho**

Myombea China and Carvalho, 1951, pp. 1120–1123.

Myombea can be characterized by its similarity to *Formicopsella*. The head is strongly rounded and "necked" behind with the eyes removed from the anterior margin of the pronotum by a distance nearly equal to the diameter of an eye, the second antennal segment is flattened, the lateral margins of the hemelytra are distinctly sinuate, and the scutellum forms a fine, somewhat posteriorly directed spine. The pronotum is much more strongly narrowed and neck-like in *Myombea* than in *Formicopsella*, approaching the condition found in *Malgacheocoris* Carvalho from Madagascar. *Aspidacanthus* from Senegal and Turkestan also has a scutellar spine as in *Myombea*.

A single species is known from East and southern Africa.

***Myombea bathycephala* China and Carvalho**

Myombea bathycephala China and Carvalho, 1951, pp. 1120–1123.

Myombea bathycephala was originally described from the Myombe River, Tanzania. A macropterous male bearing the following data, deposited in the British Museum (Natural History), is available from South Africa: "Port Shepstone, 5.97." China and Carvalho (1951) illustrated the male genitalia of this species.

***Pangania* Poppius**

Pangania Poppius, 1914a, pp. 47–48.

Although ant mimetic in general appearance and behavior, *Pangania* does not show the great degree of morphological modification

of the head as found in *Skukuza*, *Formicopsella*, and *Myombea*. The tumid pronotum, sinuate lateral corial margin, and hemelytral coloration give *Pangania* its ant-like appearance. These features, combined with the very short, appressed pubescence found over nearly the entire body surface, the short, vertical head, the very short gula, the eyes almost touching the anterior pronotal margin, and the form of the phallosheca (Fig. 180), characterize the genus.

LIST OF SPECIES OF *Pangania*

bendera Odhiambo (*Pangania*), 1967, pp. 1676–1678.

Mozambique.

chnous Odhiambo (*Systellonotopsis*), 1963, pp. 112–113.

New Combination. Tanganyika.

fasciatipennis Poppius (*Pangania*), 1914a, p. 48. East Africa; South Africa.

venusta Odhiambo (*Pangania*), 1959c, pp. 657–659, 684–685. Tanzania.

Pangania fasciatipennis Poppius

Figures 39, 178–181

Pangania fasciatipennis Poppius, 1914a, p. 48.—Carvalho, Dutra, and Becker, 1960, p. 455.

Pangania fasciatipennis is the only species in the genus known from South Africa and therefore can be recognized by the characters given in the generic diagnosis. I collected this arboreal mirid in large numbers at Pienaarsriver Dam, near Pretoria, on *Acacia karroo* Hayne (Leguminosae); *Formicopsella regneri* was found on the same plants, but in somewhat smaller numbers than *fasciatipennis*. The mirids were living in association with two species of ants, *Anoplolepis custodiens* (F. Smith) and *Camponotus* sp., and resembled them very closely. No brachypterous specimens are known for *fasciatipennis*, whereas *regneri* females from South Africa are known only in the short winged form. The brachypterous specimens are superior ant mimics over those that are macropterous. E. Bedford (unpublished) notes that *Pangania fasciatipennis* “associates with the pugnacious ant *Anoplolepis custodiens* nymphs of all sizes and adults live peacefully with ants in holes in the crotches of orange trees.”

MEASUREMENTS: Macropterous ♂—Total length 5.04, maximum width 1.56.

MALE GENITALIA: Figures 178–181.

I have designated as the lectotype of *fasciatipennis* a male speci-

men in the Helsinki Museum (Type No. 11858). It bears the labels "D.O. Afrika, Daressalam, Pangani u. hinterland, R. Regner L. G., jr. no. 10.30/09", "*Pangania fasciatipennis* n. gen. et sp. B. Poppius det.", and "LECTOTYPE *Pangania fasciatipennis* Poppius, det. R.T. Schuh."

Comparison of *P. fasciatipennis* with the holotypes of *P. venusta* Odhiambo and *P. bendera* Odhiambo indicates that these forms are very closely related and extremely difficult to distinguish from one another. I am regarding the status of *bendera* and *venusta* as questionable, but the validity of these species cannot be determined with certainty until further material is available (see also discussion under *P. chnous*).

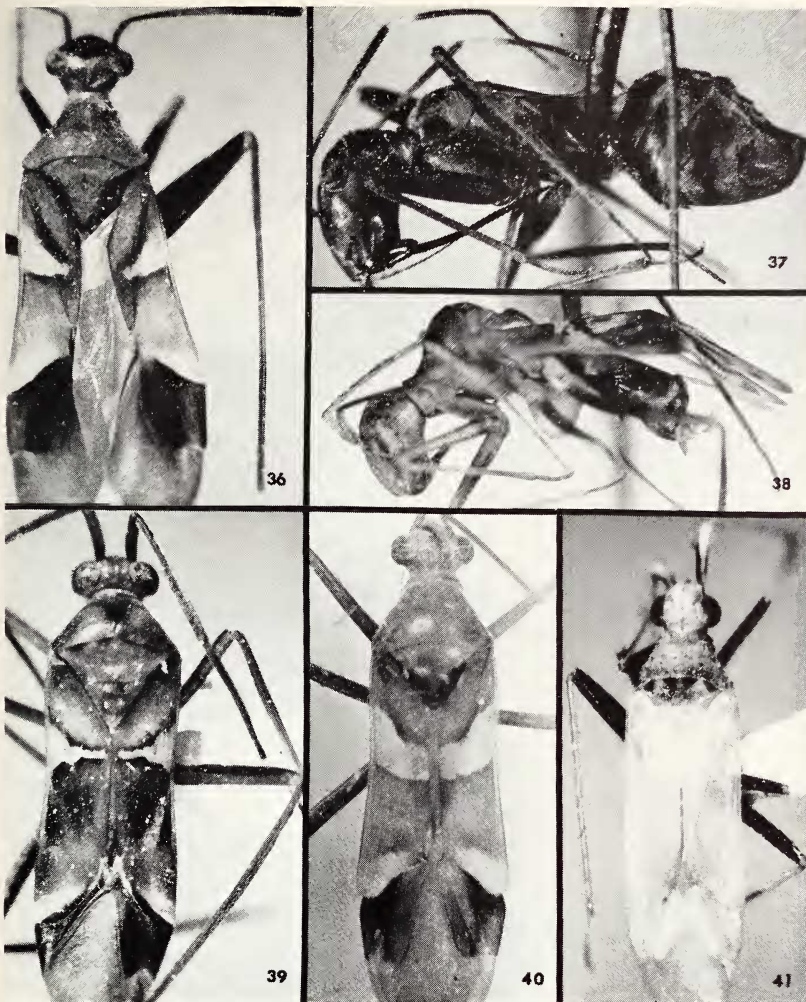
SPECIMENS EXAMINED: All specimens macropterous. *Cape Province*—1 ♂, Kimberley (Bro. Power); 1 ♂, Kimberley, 17–18 Jan. 1968, UV light; 1 ♂, Nooitgedacht, 23-10-1959, light trap (Krosing). *Natal*—1 ♀, Durban, 1902 (Muir); 2 ♀♀, Estcourt, 11-96; 1 ♀, Ngwabeni, Zululand, III.20-51 (Capener); 1 ♂, 3 ♀♀, Port Shepstone, 5.97; 1 ♀, Weenen, 14-3-97; 1 ♀, Weenen, XII.1927 (Thomasset). *Transvaal*—1 ♀, Johannesburg, V-17-50 (Capener); 1 ♀, Johannesburg, Rivonia, XII.26.1951 (Capener); 1 ♀, Kruger Nat. Park, Skukuza, 29.IV.51 (Brinck and Rudebeck); 1 ♂, Skukuza, 23.III.1952 (Janse and Vari); 1 ♀, Letaba, 19-5-1947 (Bedford); 1 ♂, Lyttelton, 26 Feb. 1968, UV light; 8 nymphs (in alcohol), 15 mi. NE Machadodorp, 4500 ft. elevation, 26–27 Mar. 1968; 1 ♂, 1 ♀, Middlefontein near Nylstroom, XII-17-1953 (Capener); 2 ♂♂, 3 ♀♀, Pienaarspoort, 19.2.64 (Capener); 8 ♂♂, 28 ♀♀ (in alcohol—2 ♂♂, 13 ♀♀, 19 nymphs), Pienarsriver Dam, 15 mi. NE Pretoria, 2 Nov. 1967 (Adults and nymphs on *Acacia karroo* Hayne); 1 ♀, Pretoria, 22-12-1951 (Capener); 16 ♂♂, 3 ♀♀, Rustenburg, XII-4-1950, XII-26-1951, III-22-1953, I-4-11-1957 (Capener); 1 ♀, Tzaneen, 11–16 Dec. 1963 (Capener); 1 ♀, Warmbaths, 4 Feb. 1964 (Capener). **TANZANIA:** 1 ♂, data as above (lectotype) (SANC, TM, BM[NH], HM, USNM, JAS, RTS).

NOTES ON EXTRALIMITAL SPECIES

***Pangania chnous* (Odhiambo), new combination**

Systellonotopsis chnous Odhiambo, 1963, pp. 112–113.

Originally described in *Systellonotopsis*, this species is certainly very closely related to *Pangania fasciatipennis*. The most obvious difference between *chnous* and *fasciatipennis* is the coloration, *chnous*



FIGS. 36-41. Hallodapini. Fig. 36. *Skukuza slateri*, male, holotype. Fig. 37. *Skukuza slateri*, female (3 mi. E. Satara Camp, Kruger National Park, Transvaal). Fig. 38. *Formicopsella regneri*, male (Pienaarsriver Dam, Pretoria, Transvaal). Fig. 39. *Pangania fasciatipennis*, male (Pienaarsriver Dam, Pretoria, Transvaal). Fig. 40. *Systellonotus brincki*, male, holotype. Fig. 41. *Trichophorella australis*, male, holotype.

having the head, pronotum, and scutellum bright orange red and the hemelytra dark gray brown with a white transverse fascia, whereas in *fasciati pennis* the entire dorsum is basically light brown with a white hemelytral fascia. The form of the vesica in *chnous* and *fasciati pennis* is very similar, but apparently the phallotheca in *chnous* lacks the dorsal projection found in *fasciati pennis* (Odhiambo, 1963). On the basis of these characters I am transferring *chnous* to *Pangania*.

Skukuza, new genus

MACROPTEROUS MALE: Elongate, ant mimetic; entire body surface very finely granulose or pruinose, dull; head, pronotum, scutellum, and anterior half of hemelytra with scattered, erect, light colored hairs about the length of diameter of antennal segment 1; most of head, posterolateral margins of pronotum, lateral corial margins, and posterior half of corium with scattered, reclining, light hairs; all antennal segments with short, semiappressed, sericeous pubescence, segment 1 also with one or two erect, fine spines on interior surface; thoracic pleura and venter glabrous; abdominal venter with elongate reclining pubescence; all coxae with a few decumbent light hairs; all femora, tibiae, and tarsi with reclining hairs.

Head strongly declivent; eyes small in relation to total size of head, removed from anterior margin of pronotum by distance about equal to the width of an eye measured from above; head forming "neck" behind eyes, width at anterior margin of pronotum equal to interocular space; frons flattened; ratio of length of head to height of head about 3:5; gula long, nearly vertical; antennae inserted below ventral margin of eyes, fossae removed from eyes by distance about equal to diameter of antennal segment 1, with low, rounded carina between eye and antennal fossa; antennal segment 1 only slightly enlarged, segment 2 tapered, distal diameter slightly greater than diameter of segment 1, segments 3 and 4 subequal in diameter, about equal to proximal diameter of segment 2; labrum flattened laterally, crescentic; pronotum roughly triangular in dorsal aspect with flattened collar of width about equal to diameter of protibia; pronotum evenly and steeply inclined posteriorly, posterior lobe transversely convex; mesoscutum and scutellum separated by an indistinct transverse impression; scutellum flattened, weakly convex; lateral margins of hemelytra sinuate, narrowest at level of mid-point of claval commissure; cuneal incisure very shallow, cuneal fracture strongly angled anteromedially; membrane with two cells; abdomen constricted basally; all tibiae with light erect spines about

length of tibial diameter, mostly on ventral surfaces, and rows of tiny, closely spaced spines; tarsal claws moderately long, evenly curved, broad basally; parempodia hair-like, parallel; pulvilli small.

MALE GENITALIA: Figures 182–184.

BRACHYPTEROUS FEMALE: See *S. slateri* below.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

TYPE SPECIES: *Skukuza slateri*, new species.

This genus is named for Skukuza, a locality in the Kruger National Park, near which several specimens of the genus were collected.

Skukuza can be separated from other African genera by the neck-like structure of the head posteriorly, the eyes being well removed from the anterior margin of the pronotum, the scutellum lacking a spine, and the antennae being inserted below and removed from the ventral margin of the eyes. This genus appears to be most closely related to *Formicopsella* in general facies and also in the form of the male genitalia, which are typical of the Hallodapini.

***Skukuza slateri*, new species**

Figures 36–37, 182–184

MACROPTEROUS MALE: Basic coloration dull gray brown; frons and all tibiae chocolate brown; antennae generally brown, median third of segment 2 somewhat lighter than remainder of segment; proximal third of antennal segment 3, transverse V-shaped macula at about midpoint of corium, and posterior margin of corium broadly white (Fig. 36).

Labium just surpassing mesocoxae; posterior margin of pronotum uniformly excavated across mesoscutum; metatarsal segments 2 and 3 subequal in length, metasarsal segment 1 slightly shorter than segment 2.

MEASUREMENTS: Total length 5.20, maximum width 1.48, length head .68, width head 1.00, interocular space .48, length pronotum .68, width pronotum 1.40, length scutellum .88, width scutellum 1.04, length corium 2.44, length clavus 1.80, length cuneus .88, width cuneus .40, length claval commissure 1.00, distance apex commissure-apex membrane 2.20, length metatibia 3.92; length antennal segments 1—.28, 2—1.92, 3—1.32, 4—?; length labial segments 1—.64, 2—.64, 3—.40, 4—.48.

MALE GENITALIA: Figures 182–184.

BRACHYPTEROUS FEMALE: Coloration, body surface texture, and vestiture as in male, except basic color slate gray.

Head very similar in structure to macropterous male, slightly larger in relation to total body size, eyes smaller relative to total

size of head, antennae somewhat further removed from eyes (by distance about equal to twice diameter of antennal segment 1); head slightly more conical in shape than in male and genal and gular regions larger; pronotal collar as in male, but pronotum arched longitudinally behind collar with posterior lobe nearly horizontal; pronotum transversely convex, posterior margin weakly concavely excavated across mesoscutum; scutellum nearly flat; hemelytra greatly reduced, undifferentiated, attaining posterior margin of abdominal tergite 2; posterior margins of hemelytra evenly rounded, upturned; legs very long, structure as in male; abdomen constricted basally, greatly enlarged medially, tapering to an acute apex.

MEASUREMENTS: Total length 5.12, maximum width 1.48, width head 1.16, interocular space .68.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate; sclerotized rings ovoid, lateral margins slightly upturned.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Kruger National Park, Letaba River at Letaba Camp, 1 May 1968, T. Schuh, J. A. & S. Slater, M. Sweet (SANC).

PARATYPES: *Transvaal*—4 macropterous ♂♂, same data as holotype; 2 macropterous ♂♂, 6 brachypterous ♀♀, 3 mi. E. Satara Camp, Nwanedzi River, 29 April 1968; 1 macropterous ♂, 2 brachypterous ♀♀, 9 mi. SSW Skukuza, 26 April 1968 (SANC, JAS, RTS).

This species is named for Dr. James A. Slater, of the University of Connecticut, who introduced me to the fauna of South Africa, and who has continued to stimulate my interest in the Miridae of the region.

As the only known species of the genus occurring in South Africa, *slateri* can be recognized by the complex of characters given in the generic discussion (see also discussion under *S. zeugma* below).

All known localities for *Skukuza slateri* are in the low veld of the northeastern Transvaal. I took specimens at three different localities, all of which were very dry, open areas with scattered grasses and forbs, the total vegetative cover probably never exceeding 50 percent of the substrate surface area. The sites were heavily grazed so that the vegetation was almost mat-like.

Skukuza slateri is remarkably ant-like in habitus and behavior. It is so elusive that collecting only a very few specimens can be a great accomplishment; species of the ant-mimetic rhyparochromine lygaeid genus *Poeantius* are some of the few ground living bugs that are as agile as *Skukuza*. No ant association was obvious at any of

the collection sites. *Skukuza* was taken in the same habitat with *Poantius* sp.

NOTES ON EXTRALIMITAL SPECIES

Skukuza zeugma (Odhiambo), new combination

Formicopsella zeugma Odhiambo, 1959c, pp. 652–655, 684–685.

Described in *Formicopsella*, this species is much more closely related to *Skukuza slateri* than it is to *F. regneri*. The figures of the head of *zeugma* given by Odhiambo (1959c) are deceptive, in that they show the antennae as being inserted dorsad of the ventral margin of the eyes. The antennae are in fact inserted somewhat below the ventral margin of the eyes, very much as in *S. slateri*. The holotype of *zeugma*, from which Odhiambo's (1959c) drawings were made, is card mounted and has the head flexed upward and anteriorly, giving a false impression of the antennal insertion. The basic structure of the head is very similar in *zeugma* and *slateri*, with the frons being flattened, whereas in *Formicopsella* the frons is very strongly rounded. The vestiture of *zeugma* consists of a few erect hairs and a rather dense covering of decumbent, weakly shining hairs, and is very much like that of *slateri*, although in the latter species the decumbent hairs are sparsely placed. The anterior fascia of the hemelytra is broad, complete, and nearly parallel sided in *zeugma*, whereas it forms a triangular macula on each hemelytron in *slateri*. Both species have a similar dull gray coloration.

Systellonotopsis Poppius

Systellonotopsis Poppius, 1914a, pp. 43–44.

Systellonotopsis is probably most closely related to *Pangania*. It differs in having long erect hairs on the dorsum, whereas in *Pangania* there are only short decumbent hairs. Only two species are presently placed in the genus, although Odhiambo (1959b; 1963) has described species in the genus that I feel are more closely related to other genera.

LIST OF SPECIES OF *Systellonotopsis*

bifasciatus Poppius (*Systellonotopsis*), 1914a, p. 44. Botswana; South West Africa.

* *chnous* Odhiambo (*Systellonotopsis*), see *Pangania chnous* (Odhiambo) **New Combination.**

pandus Odhiambo (*Systellonotopsis*), 1963, pp. 111–112. Tanganyika.

* *pumilis* Odhiambo (*Systellonotopsis*), see *Trichophthalmocapsus pumilis* (Odhiambo) **New Combination.**

***Systellonotopsis bifasciatus* Poppius**

Systellonotopsis bifasciatus Poppius, 1914a, p. 44.

Systellonotopsis bifasciatus most closely resembles *Pangania fasciatipennis* in southern Africa, but can be separated from it by the presence of erect hairs on the dorsum. All known specimens are females and therefore the structure of the male genitalia is not known.

Described from a single female from "Bechuanaland," additional specimens of *bifasciatus* were not recorded in the literature subsequent to the original description until Carvalho et al. (1960), recorded a specimen from Royal Natal National Park, Natal; comparison of this specimen with the holotype of *bifasciatus* indicates, however, that it is not in fact *S. bifasciatus*, but *Systellonotus brincki*, which is described as new below. The holotype of *S. bifasciatus* was noted by Poppius as being deposited in the Berlin-Humboldt Museum; in fact it is in the Helsinki Museum (Type No. 11859).

Comparison of a female specimen from Abachaus, Damaraland, South West Africa, deposited in the Transvaal Museum, with the holotype of *S. bifasciatus*, indicates that the two are conspecific. Both of these specimens have short, decumbent hairs on the dorsum, which were not mentioned in the original description, as well as the erect hairs pointed out by Poppius. The total length of the Damaraland specimen is 4.40 mm.; the maximum width is 1.24 mm.

***Systellonotus* Fieber**

Systellonotus Fieber, 1858, p. 326.

Systellonotus contains approximately 14 species. Up to the present time the genus has been known only from the Palearctic, primarily from the Mediterranean and North Africa. A single species is described below from South Africa.

***Systellonotus brincki*, new species**

Figures 40, 185-188

Systellonotopsis bifasciatus Carvalho, Dutra, and Becker, 1960 (*nec* Poppius), p. 456.

MACROPTEROUS MALE: Basic coloration dull, rather light reddish brown; distal two-thirds of antennal segment 3, complete broad

transverse fascia at level of middle of claval commissure, apex of corium broadly, and ostiolar peritreme white; cuneus castaneous; membrane light smoky brown with white bloom.

Elongate; entire body smooth, dull, weakly pruinose; cell of membrane and base of cuneus shining; dorsum with decumbent and semierect, moderately long, light hairs; antennal segment 1 with inconspicuous, decumbent light hairs, and a few erect, light, slender spines, segments 2, 3, and 4 with dense, short, decumbent, light vestiture; eyes with some very short hairs; labium with a few moderately long, erect hairs basally and some very short hairs; femora with decumbent light hairs and a few semierect light hairs; tibiae with reclining light hairs and scattered, semierect, light spines about as long as tibial diameter; abdomen with reclining light hairs and scattered, long, erect, light hairs.

Head strongly deflexed, frons nearly vertical; eyes large, protuberant, strongly granular, removed from anterior margin of pronotum by distance about equal to diameter of antennal segment 2; vertex nearly flat, not elevated above level of pronotal collar; head constricted slightly behind eyes; anterior margins of eyes very weakly sinuate; antennae inserted somewhat below middle of anterior margin of eyes, fossae contiguous with eyes; antennal segment 1 slightly enlarged, weakly bowed; antennal segment 2 nearly cylindrical, slightly narrowed proximally, about equal in diameter to segment 1, segments 3 and 4 of slightly smaller diameter than segment 2; eyes occupying slightly over half of height of head; clypeus prominent; bucculae narrow; gula moderately long, inclined about 45°; labium just surpassing metacoxae; pronotum elevated posteriorly, weakly tumid; lateral margins nearly straight; pronotum rather strongly narrowed anteriorly, collar flat, about as wide as diameter of antennal segment 1, calli poorly defined; posterior margin of pronotum concavely excavated across mesoscutum, convexly rounded laterally; mesoscutum steeply inclined anteriorly; scutellum convex; lateral margins of hemelytra distinctly sinuate, widest just anterior to apex of corium; base of cuneus recessed mesiad of lateral corial margin by distance about equal to diameter of antennal segment 2; membrane with 2 cells; posterior margins of cells evenly rounded; abdomen very slender, reaching to apex of cuneus; legs long; femora weakly bowed; all tibiae with longitudinal rows of tiny, closely-spaced spines; metatarsal segment 1 about one-fourth length of segment 2, segments 2 and 3 subequal in length; claws long, gently curved, slightly broadened basally; parempodia hair-like, parallel; pulvilli minute.

MEASUREMENTS: Total length 5.12, maximum width 1.52, length head .40, width head .88, interocular space .30, length pronotum .64, width pronotum 1.24, length scutellum 1.00, length corium 2.60, length clavus 2.00, length cuneus .72, width cuneus .36, length claval commissure 1.28, distance apex commissure-apex membrane 2.64, length metatibia 3.80; length antennal segments 1—.64, 2—1.80, 3—1.46, 4—?; length labial segments 1—.60, 2—.60, 3—.54, 4—.52.

MALE GENITALIA: Figures 185–188.

Females unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Orange Free State*, Bultfontein, 8.1.07 (TM).

PARATYPES: 1 macropterous ♂, same data as holotype. *Natal*—1 macropterous ♂, Natal National Park, The Hostel, 3.IV.51 (Brinck and Rudebeck); 1 macropterous ♂, U. So. Afri., N. Y. 107793, X-27-49-18552, *Erica bergiana* (TM, LU, USNM, RTS).

This species is named for Dr. Per Brinck of the Lund University Zoological Institute.

Systellonotus brincki most closely resembles *Pangania fasciatipennis* and *Systellonotopsis bifasciatus* in South Africa, but differs in that the abdomen is long and slender, the gula is moderately long, and the eyes occupy only about two-thirds the height of the head; *brincki* additionally differs from *fasciatipennis* in that the dorsum has erect hairs and the phallosheca lacks the dorsal projection. *S. brincki* also resembles *Carinogolus* to some extent in dorsal aspect but lacks the carinate gula.

Additional specimens from South Africa probably representing new species of *Systellonotus* include a macropterous male from Grootfontein, Middleburg, Cape Province, deposited in the South African National Collection of Insects, a macropterous male from Namakunde, South West Africa, deposited in the South African Museum, and a macropterous male from Mafa, South West Africa, also deposited in the South African Museum. These specimens appear to represent two species but are badly mutilated and therefore I have not considered it advisable to describe them at the present time.

Trichophorella Reuter

Trichophorella Reuter, 1905b, p. 20.

Trichophorella is characterized by its pinkish coloration, elongate body form, nearly parallel sided hemelytra, globose head, strongly granular almost hemispherical eyes, and a few erect, black

setiform hairs on the dorsum. This genus is probably most closely related to *Marmorodapus* Schmitz, and somewhat less closely related to other members of the *Aeolocoris* group.

LIST OF SPECIES OF *Trichophorella*

australis, new species. South Africa: Transvaal.

rubella Odhiambo (*Trichophorella*), 1959c, pp. 678-680.

Uganda.

sordidipennis Reuter (*Trichophorella*), 1905b, p. 21. "As-sinie, Afrique oc."

***Trichophorella australis*, new species**

Figures 41, 189-192

MACROPTEROUS MALE: Elongate, parallel sided; general coloration of dorsum cream with pinkish tinge; head and pronotal calli slightly orangish; pronotal collar, posterior lobe of pronotum and mesoscutum suffused with brown; antennal segment 1 cream dorsally, mahogany ventrally and laterally on proximal half; antennal segments 2 and 3 cream, segment 4 deep red; labium yellowish, segment one red on distal half; head below eyes and antennal bases red; thoracic pleura red to mahogany; abdomen cream medioventrally, mahogany lateroventrally and on posterior third; all coxae, trochanters, tibiae, and tarsi cream; all tibiae with a red stripe dorsally; all femora mahogany; bases of some hairs on hemelytra and inner margin of cuneus with reddish suffusion; membrane almost white.

Body surface smooth, dull; head and pronotum with decumbent sericeous hairs; hemelytra with decumbent golden hairs; antennae with very short, appressed pubescence, segment 1 with numerous, erect, white, peg-like hairs about as long as diameter of segment 2, segment 2 with a peg-like hair proximally; pronotum and hemelytra with a few, short, black, erect, spine-like hairs; legs generally with short, decumbent hairs; metafemora with a few, fine, black spines dorsally and some long erect hairs ventrally.

Head globose as viewed from above; eyes large, nearly hemispherical as viewed from above, occupying nearly entire sides of head posterior to antennal bases, contiguous with anterior margin of pronotum, granular; vertex weakly longitudinally sulcate; frons weakly transversely rugose, strongly convex; antennae inserted at middle of anterior margin of eyes, segment 1 enlarged, segment 2 about three-fourths diameter of segment 1, segment 3 slightly smaller in diameter than segment 2, segment 4 slightly smaller in diameter than segment 3; clypeus compressed laterally; labium just surpass-

ing metacoxae; pronotum with lateral margins nearly straight, posterior margin deeply excavated across mesoscutum, collar about width of diameter of antennal segment 3, calli indistinct; mesoscutum and scutellum nearly flat, separated by a weak transverse impression; hemelytra nearly parallel sided; cuneus slightly recessed mesiad of lateral corial margin; abdomen almost reaching apex of cuneus; tibiae with scattered light spines of length about equal to tibial diameter; metatarsal segments 2 and 3 subequal in length, segment 1 about half length of segment 2; claws long, evenly curved; parempodia hair-like, parallel; pulvilli minute.

MEASUREMENTS: Total length 4.80, maximum width 1.33, length head .46, width head .78, interocular space .28, length pronotum .44, width pronotum 1.12, length scutellum .84, width scutellum .88, length corium 2.44, length clavus 1.80, length cuneus .76, width cuneus .28, length claval commissure 1.04, distance apex commissure-apex membrane 2.04, length metatibia 2.76; length antennal segments 1—.68, 2—1.88, 3—1.22, 4—.88; length labial segments 1—.58, 2—.50, 3—.52, 4—.48.

MALE GENITALIA: Figures 189–192.

MACROPTEROUS FEMALE: Very similar to male except eyes much smaller and vertex relatively wider.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Lyttelton, 29 Feb. 1968, J. A. & S. Slater, UV light (SANC).

PARATYPES: *Transvaal*—1 macropterous ♂, same data as holotype; 2 macropterous ♂♂, *idem*, except 20 Feb. 1968; 1 macropterous ♂, Rustenburg, 7–17 Nov. 1967 (Capener); 1 macropterous ♂, Pretoria, 12.III.1952 (Vari); 1 macropterous ♀, Pretoria, 27.III.1956 (Vari); 1 macropterous ♀, Johannesburg, V-17-1950 (Capener); 1 macropterous ♂, 1 macropterous ♀, Reitfontein, 30.11.04 (SANC, TM, JAS, RTS).

This species is named for its occurrence in southern Africa.

The most distinctive difference between *T. australis* and the other two species of the genus is that in *australis* the cuneus is light and nearly unicolorous with the remainder of the hemelytra, whereas in *sordidipennis* Reuter and *rubella* Odhiambo the cuneus is dark red or brown and strongly contrasting with the remainder of the hemelytra. Also in *australis* antennal segment 1 is about one-third the length of segment 2 and half the length of segment 3, proportions quite different from those given by Poppius (1914a) for *sordidipennis* and by Odhiambo (1959c) for *rubella*. I have examined the holotype of *sordidipennis* from "Assinie, Afrique oc." deposited

in the Helsinki Museum (Type No. 12072), but have not been able to confirm the accuracy of Poppius' data on the antennal proportions because the head is missing from this female specimen.

No field information is available for this species (or for the genus as a whole); nearly all available specimens were taken at lights.

Trichophthalmocapsus Poppius

Trichophthalmocapsus Poppius, 1914a, pp. 46-47.—Odhiambo, 1959c, p. 664.

The characters most useful for diagnosing *Trichophthalmocapsus* are: 1) eyes in males extremely large, occupying almost the entire sides of the head, the eyes of the females much smaller, the vertex relatively much wider, and the genae exposed; 2) posterior tibiae usually enlarged, spindle-shaped, with very long slender spines, and usually lacking short appressed vestiture; 3) hemelytra with noticeably sinuate lateral margins, widest at a point just anterior to the cuneal incisure; 4) lateral corial margins and inner surface of metafemora modified to form a stridulatory mechanism; and 5) vesica S-shaped. The genus is most closely related to *Boopidella* Reuter by the extremely large eyes and to *Laemocoris* and *Hallodapus* (in part) by the stridulatory mechanism, and to all 3 of these genera by the general facies. Odhiambo (1959c) used the size of the eyes to separate *T. hirsutus* Odhiambo, which was described from a female, from *T. vittatus* Odhiambo and *T. pilosus* Poppius, both of which were described from males; this character is not valid, however, when both sexes are present, because the eyes are much smaller in the females than in the males, as was correctly pointed out by China (1932).

All species of *Trichophthalmocapsus*, *Laemocoris*, and some species of *Hallodapus* have a wing edge stridulatory mechanism. The lateral corial margin is finely serrate and forms the stridulitrum; the inner surface of the metafemora is "pebbled" or strongly granular and forms the stridulatory plectrum. Although the corial serrations are very often extremely minute and difficult or impossible to see, the femoral modifications are readily visible in all species that are known to possess the stridulatory mechanism.

LIST OF SPECIES OF *Trichophthalmocapsus*

australis, new species. South Africa: Transvaal, Natal.

* *chariensis* Odhiambo (*Trichophthalmocapsus*), see *Hallodapus albofasciatus* (Motschulsky) **New Synonymy.**

hessei, new species. South West Africa.

- hirsutus* Odhiambo (*Trichophthalmocapsus*), 1959c, pp. 660–661, 664, 685. Tanzania.
jamesi China (*Trichophthalmocapsus*), 1932, pp. 594–597. Kenya.
pilosus Poppius (*Trichophthalmocapsus*), 1914a, p. 47. Tanzania.
pumilis Odhiambo (*Systellonotopsis*), 1959c, pp. 655–657, 684–685. **New Combination.** Ethiopia; Uganda.
* *vittatus* Odhiambo (*Trichophthalmocapsus*), see *Halodapus vittatus* (Odhiambo) **New Combination.**

***Trichophthalmocapsus australis*, new species**

Figures 33, 194–196

Trichophthalmocapsus jamesi Carvalho, Dutra, and Becker, 1960 (*nec* China), pp. 456–457.

MACROPTEROUS MALE: Basic coloration brownish black; rounded macula just anterior to midpoint of corium, posterior margin of corium, mesocoxae and metacoxae, and all trochanters white; juga and lora reddish; antennal segment 1 and all tarsi light brown; antennal segment 2 (segments 3 and 4 missing in holotype) and remainder of legs castaneous; membrane smoky brown.

Dorsum, except cuneus, smooth and dull or weakly pruinose; cuneus and legs weakly shining; dorsum with short, decumbent, sericeous hairs and long, semierect, weakly shining hairs; antennae with very short appressed pubescence and some erect hairs about as long as $1\frac{1}{4}$ times diameter of antennal segment 2; eyes with a few short hairs; venter with scattered light hairs; femora with long, erect, light hairs.

Head vertical, short; eyes very large, granular, protuberant, occupying nearly entire sides of head, reaching to bucculae; head slightly convex behind eyes; vertex narrow, depressed between eyes, posterior margin ecarinate, concave; antennae inserted just below middle of sinuate anterior margins of eyes; antennal segment 1 slightly enlarged, segment 2 of slightly smaller diameter than segment 1; gula obsolete; bucculae small; labium just surpassing metacoxae; pronotum with collar about as wide as diameter of antennal segment 1, calli distinct, rather widely separated, lateral margins nearly straight, posterior margin forming a low concave angle across scutellum; mesoscutum inclined anteriorly; scutellum convex; lateral corial margins weakly sinuate, very finely serrate (stridulitrum); cuneal incisure shallow, fracture strongly angled anteromedially; membrane with one visible cell; abdomen just attaining apex of corium; profemora and metafemora and tibiae of more or less con-

ventional form; metafemora weakly bowed, inner and posterior surfaces glabrous, with numerous, tiny, short ridges arranged linearly (stridulatory plectrum); metatibiae thickened, spindle-shaped; all tibiae with semierect light spines of length ranging from less than tibial diameter to nearly three times tibial diameter, and with rows of tiny, closely spaced black spines; metatarsal segments 1 and 2 subequal in length, segment 3 slightly longer than segment 2.

MEASUREMENTS: Total length 3.52, maximum width 1.20, length head .26, width head .72, interocular space .16, length pronotum .34, width pronotum 1.00, length scutellum .66, width scutellum .70, length corium 1.76, length clavus 1.32, length cuneus .70, width cuneus .30, length claval commissure .74, distance apex commissure-apex membrane 1.50, length metatibia 1.86; length antennal segments 1—.36, 2—1.06, 3—?, 4—?; length labial segments 1—.34, 2—.36, 3—.34, 4—.44.

MALE GENITALIA: Figures 194–196.

MACROPTEROUS FEMALE: Similar to male, except eyes much smaller, vertex relatively wider, and gena exposed below eyes.

MEASUREMENTS: Total length 3.40, maximum width 1.12, width head .66, interocular space .34.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Kruger Nat. Park, Punda Milia Camp, 7 May 1968, Slater, Schuh, Sweet, at light (SANC).

PARATYPES: *Transvaal*—1 macropterous ♀, Kruger National Park, Letaba Camp, 6.V.51, at light in evening (Brinck and Rudebeck); 1 macropterous ♂, Rustenburg, XII-4-1950 (Capener) (LU, JAS).

ADDITIONAL SPECIMENS: *Natal*—1 macropterous ♀, Weenen, ii.1924 (Thomasset) (BM[NH]).

This species is named for its occurrence in southern Africa.

See discussion under *T. hessei*.

***Trichophthalmocapsus hessei*, new species**

Figures 34–35, 193

Trichophthalmocapsus pilosus Carvalho, Dutra, and Becker, 1960 (*nec* Poppius), pp. 456–457.

MACROPTEROUS MALE: Basic coloration dark brown; transverse hourglass-shaped fascia on corium at level of apex of scutellum, posterior margin of corium narrowly, all coxae and trochanters, and ostiolar peritreme white; membrane smoky brown; distal two-thirds of antennal segments 3 tan (segment 4 missing in holotype).

Head and anterior lobe of pronotum and venter polished, shining; remainder of dorsum dull, weakly pruinose; dorsum with long, semierect, light hairs; antennal segment 1 with a long, thin, semierect spine on interior surface; antennal segments 2 and 3 with very short, appressed, light pubescence (segment 4 missing in holotype); eyes with a few very short hairs; abdominal venter with elongate, reclining hairs; femora with short decumbent hairs; protibiae and mesotibiae with short, spine-like hairs of length less than tibial diameter; metatibiae with semierect spines of length twice tibial diameter.

This species is similar in structure to *T. australis* except as follows: lateral corial margins without visible serrations (at 150 $\times$); inner surface of metafemora pebbled; metatibiae not spindle-shaped, cylindrical; metatarsal segment 1 slightly shorter than segment 2, segment 2 slightly shorter than segment 3.

MEASUREMENTS: Total length approx. 3.50, maximum width 1.20, length head .26, width head .72, interocular space .16, length pronotum .34, width pronotum 1.00, length scutellum .66, width scutellum .70, length corium 1.76, length clavus 1.32, length cuneus .66, width cuneus .30, length claval commissure .74, distance apex commissure-apex membrane 1.50, length metatibia 1.86; length antennal segments 1—.36, 2—1.06, 3—?, 4—?; length labial segments 1—.34, 2—.36, 3—.34, 4—.44.

MALE GENITALIA: Figure 193.

MACROPTEROUS FEMALE: Differing from male as in *T. australis*.

MEASUREMENTS: Total length 3.52, maximum width 1.28, width head .70, interocular space .36.

HOLOTYPE: Macropterous ♂, SOUTH WEST AFRICA: Kaokoveld, Ohopoho, 4.VI.51, No. 325, at light in evening, Expedition 1950–1951, Brinck-Rudebeck (LU).

PARATYPES: SOUTH WEST AFRICA—2 macropterous ♀♀, Warmbad, Kaokoveld, Mus. Expd., Feb. 1925 (SAM).

This species is named for Dr. A. J. Hesse, Curator of Insects, South African Museum, Cape Town, who has added greatly to our knowledge of the insect fauna of South and South West Africa.

Trichophthalmocapsus hessei is probably most closely related to *T. pilosus* but differs in having antennal segment 1 dark, whereas it is white in *pilosus*, and in lacking the short decumbent hairs on the dorsum. *T. hessei* can be separated from *T. australis* in that the stridulitrum is not visible on the lateral corial margin and the dorsum lacks short decumbent hairs; the stridulitrum is very obvious in *australis* and the dorsum has both long and short hairs.

NOTES ON EXTRALIMITAL SPECIES

Trichophthalmocapsus pilosus Poppius

Trichophthalmocapsus pilosus Poppius, 1914a, p. 47.

Poppius (1914a) in his original description of *T. pilosus*, indicated that the holotype was deposited in the Berlin-Humboldt Museum. It is actually in the Helsinki Museum (Type No. 11870).

Trichophthalmocapsus pumilis (Odhiambo), new combination

Systellonotopsis pumilis Odhiambo, 1959c, pp. 655-657, 685.

Examination of a male paratype of *Systellonotopsis pumilis* in the British Museum (Natural History) indicates that this is in fact a species of *Trichophthalmocapsus*. The eyes of *pumilis* are very large, the metafemora have very long, glassy spines, and the stridulatory device is present.

NOTES ON EXTRALIMITAL GENERA

Aeolocoris Reuter

Aeolocoris Reuter, 1903, p. 17.

Aeolocoris presently contains three species from North and East Africa. It is most closely related to *Azizus* and *Acrorrhinium*.

Aeolocoris alboconspersus Reuter

Aeolocoris alboconspersus Reuter, 1903, p. 17

Reuter (1903) described this species from specimens from Obock, Djibouti, and Arabia Meridionalis (Aden). I am designating as the lectotype, a female specimen in the Paris Museum. It bears the following labels: "Museum Paris, DJIBOUTI, H. Coutiere 1897"; "*Aeolocoris alboconspersus* Reut. n. g. et sp. sp. typ."; and "LECTOTYPE *Aeolocoris alboconspersus* Reuter, det. R. T. Schuh." Wagner (1970b) stated that a specimen in the Helsinki Museum from Obock, bearing the label "*Aeolocoris alboconspersus* Reut. typ." was the holotype, but this certainly is incorrect because Reuter (1903) stated that he examined more than one specimen but did not designate a holotype.

Boopidella Reuter

Boopidella Reuter, 1907b, p. 25.

Boopidella appears to be most closely related to *Trichophthalmocapsus* by its large eyes, but differs from that genus in lacking

the long erect hairs on the dorsum, having the tibiae mutic, and lacking the stridulatory device. A single species of *Boopidella* is known from East Africa.

***Boopidella fasciata* Reuter**

Boopidella fasciata Reuter, 1907b, p. 25.

Boopidella fasciata was described from four male specimens from Pemba Island (Tanzania). I am designating a specimen in the Helsinki Museum (Type No. 10270) bearing the labels "Pemba" and "*Boopidella fasciata* Reut. Typ." as the lectotype and adding the label "LECTOTYPE *Boopidella fasciata* Reuter, det. R. T. Schuh."

***Diocoris* Kirkaldy**

Diocoris Kirkaldy, 1902c, p. 246.

Systellonotidea Poppius, 1914a, p. 29. **New Synonymy.**

Diocoris exhibits sexual dimorphism in the form of the pronotum. The males have the collar depressed and demarcated from the remainder of the pronotum; the females have the collar evenly arched with the remainder of the pronotum and separated from it by only a finely impressed line. This difference was recognized by Poppius (1914a) as of generic significance, and he therefore placed *Diocoris agalestus* Kirkaldy and *Systellonotidea triangulifer* Poppius in separate genera. Poppius however had only a female of *agalestus* and a male of *triangulifer*. Now that the different pronotal structures can be verified as a sexually dimorphic character, it is apparent that *Systellonotidea* is congeneric with *Diocoris* based on the structure of the head, the type of hemelytral fascia, and the structure of the male genitalia.

Odhambo (1959c) recognized the genus *Gampsodema* Odhambo as distinct from *Diocoris* on the basis of its strongly flattened metafemora. This structural feature also occurs in some species of *Diocoris*, although not to the pronounced degree found in *Gampsodema spissata* Odhambo, and it may be found that the two genera will have to be considered as synonymous.

Diocoris presently includes five species from East and West Africa.

***Diocoris agalestus* Kirkaldy**

Diocoris agalestus Kirkaldy, 1902c, p. 246.

A single specimen of *Diocoris agalestus* Kirkaldy, labeled "Guinee, Addah (Reitter)" is in the Helsinki Museum, and may be the

holotype of this species (personal communication, Martin Meinander, Helsinki Museum).

LEUCOPHOROPTERINI, new tribe

Karoocapsus, new genus

MACROPTEROUS MALE: Elongate, relatively large, nearly parallel sided; brown or brownish black, usually with strongly contrasting, large, yellowish hemelytral maculae; body surface smooth, dull or weakly shining; dorsum with reclining light and/or dark setiform hairs and also appressed, scale-like, sericeous hairs, particularly on the head, pronotum, scutellum adjacent to the claval suture, and on the mesepisterna and metepisterna and sometimes on the abdomen; antennae with short, dark, reclining vestiture.

Head declivent, concave behind; eyes moderately large, protuberant, not reaching gula ventrally; vertex nearly as wide as anterior margin of pronotum, flat or slightly depressed, posterior margin usually carinate; frons weakly convex, transversely rugose; antennae inserted just above ventral margin of eyes, fossae contiguous with eyes; antennal segment 1 moderately enlarged, segment 2 usually cylindrical, of slightly smaller diameter than segment 1, segments 3 and 4 about two-thirds diameter of segment 2; labium reaching at least to metacoxae; pronotum with anterior margin finely carinate, upturned, lateral and posterior margins nearly straight or slightly concave; mesoscutum separated from weakly convex scutellum by distinct transverse impression; lateral corial margins nearly straight; cuneal incisure shallow or obsolete, cuneal fracture angled slightly anteromedially; membrane with two cells; legs long; tibiae with scattered, semierect, black spines about as long as tibial diameter and rows of tiny, closely spaced black spines; tarsal claws long, slender, gently curved; parempodia hair-like, parallel; pulvilli minute.

MALE GENITALIA: Figures 197–219. Vesica U-shaped, weakly twisted, gonopore apical; phallosome L-shaped; left clasper trough-like; right clasper lanceolate.

BRACHYPTEROUS FEMALE: See discussion under *K. pulchrus*.

FEMALE GENITALIA: Unknown.

TYPE SPECIES: *Karoocapsus middleburgensis*, new species.

This genus is named for its predominant occurrence in the Little and Great Karoo and other arid areas of South Africa. I have followed Acocks (1953) in the spelling of Karoo, although it is commonly spelled Karroo.

Karoocapsus can be separated from other South African Phylinae

by the following combination of characters: 1) parempodia hair-like, parallel; 2) claws long, slender; 3) head declivent, concave behind; 4) dorsum with reclining setiform hairs and appressed scale-like sericeous hairs; 5) hemelytra usually dark brown with strongly contrasting yellowish maculae; and 6) anterior margin of pronotum carinate, upturned. The genus is most closely related to *Leucophoroptera* Poppius from Australia. Only *Lasiolabopella* in South Africa has scale-like hairs (these are very easily removed in *Karoocapsus*), although several genera have wooly sericeous hairs on the dorsum. Most members of the Hallodapini have light hemelytral maculae, but none have scale-like hairs and all have a flattened pronotal collar very much different from the carinate anterior pronotal margin of *Karoocapsus*.

Karoocapsus can be divided into several species groups based on the coloration pattern. These divisions are very helpful in the preliminary identification of species, and are used in the following key. The male genitalia, however, are most useful in separating apparently closely related species (e.g. *flavomaculatus*, *middelburgensis*, and *trifasciatus*), and often show much different relationships between species than those suggested by coloration.

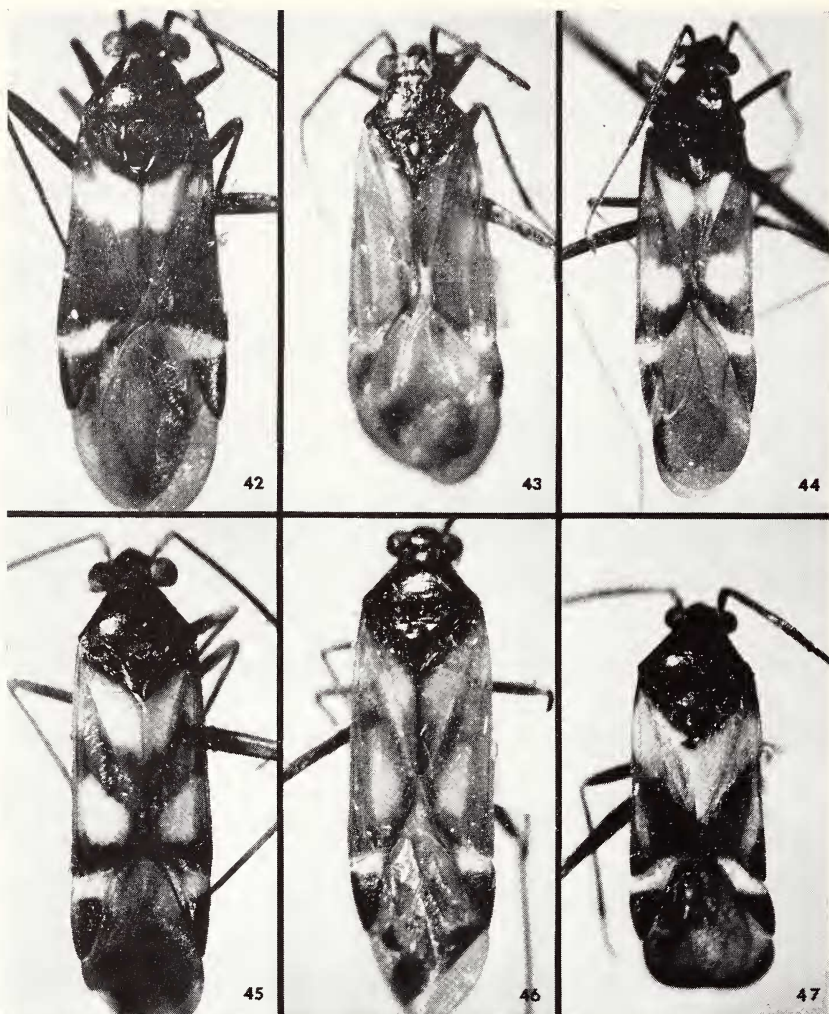
The type of coloration pattern found in *Karoocapsus* is not uncommon in ant-mimic Miridae, and in genera such as *Hallodapus* contributes to the ant-mimic habitus when combined with appropriate behavior, even though dead specimens are not particularly ant-like. Both sexes of *Karoocapsus* are probably ant mimetic, although the females are probably superior mimics because of their morphological specialization relative to the males.

Most of the known specimens of *Karoocapsus* are from light traps. Five of the eight described species are from a single locality, Grootfontein, Middelburg, Cape Province. All of these species were collected during October, although some were taken during other months as well. No ecological data are available for any species of *Karoocapsus*, but there is a high probability that they are ground living as are most phyline ant-mimics.

KEY TO SPECIES OF *Karoocapsus*

Macropterous specimens

1. Hemelytra uniformly light brown translucent --- *brunneus* (Fig. 43)
Hemelytra with yellowish quadrate or elongate maculae, more or less strongly contrasting with dark brown background coloration -- 2
2. Hemelytra with broad white or yellowish transverse fascia on basal half of corium; posterior half of corium dark brown, without light markings; basal third of cuneus white or yellow ----- 3



FIGS. 42-47. Leucophoropterini. Fig. 42. *Karoocapsus bifasciatus*, male (Grootfontein, Middelburg, Cape Province). Fig. 43. *Karoocapsus brunneus*, male, holotype. Fig. 44. *Karoocapsus flavomaculatus*, male, holotype. Fig. 45. *Karoocapsus middelburgensis*, male, holotype. Fig. 46. *Karoocapsus obscurus*, male, holotype. Fig. 47. *Karoocapsus occidentalis*, male, holotype.

sterna and metepisterna, and posterior margin of abdominal sternite 4 with sericeous, scale-like hairs.

Vertex flat; antennal segment 1 with a few erect black spines about as long as tibial diameter, segment 2 about equal in diameter to segment 1, tapering to about two-thirds greatest diameter on proximal fourth, segments 3 and 4 about half diameter of segment 2; labium not quite reaching posterior margin of mesocoxae; posterior margin of pronotum weakly concave; calli obsolete; hemelytra broadest at apex of corium; abdomen reaching to apex of cuneus; metatarsal segments 2 and 3 subequal in length, segment 1 about two-fifths length of segment 2.

MEASUREMENTS: Total length 4.96, maximum width 1.40, length head .40, width head .96, interocular space .40, length pronotum .60, width pronotum 1.36, length scutellum .68, width scutellum .96, length corium 2.24, length clavus 1.60, length cuneus .92, width cuneus .35, length claval commissure .88, distance apex commissure-apex membrane 2.56, length metatibia 3.04; length antennal segments 1—.36, 2—1.60, 3—?, 4—?; length labial segments 1—.46, 2—.48, 3—.38, 4—.46.

MALE GENITALIA: Figures 197–199.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Grootfontein, Middelburg, October, M. Johannsmeier (SANC).

PARATYPES: *Cape Province*—6 macropterous ♂♂, same data as holotype; 1 macropterous ♂, Bushmanland, Henries, Lightfoot, October 1917. SOUTH WEST AFRICA—1 macropterous ♂, Bulls-poort, 20.4.49 (Strey) (SANC, SAM, JAS, RTS).

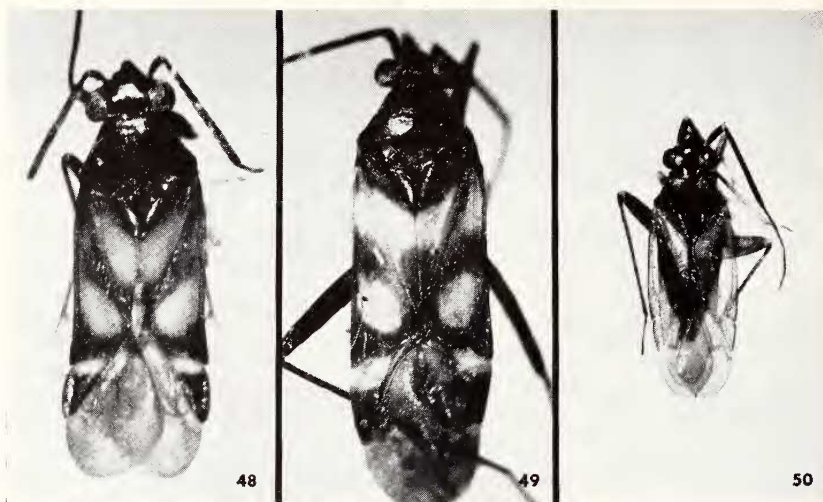
This species is named for the two conspicuous light fasciae on the hemelytra.

Karoocapsus bifasciatus is most closely allied to *K. occidentalis*, in that it does not possess light colored maculae on the posterior half of the corium. The two species can be easily separated from one another in that *bifasciatus* has the clavus adjacent to the posterior third of the claval commissure dark and *occidentalis* has the clavus light along the entire length of the commissure. The male genitalia (Figs. 197–199, 211–213) are also distinctive for the two species.

***Karoocapsus brunneus*, new species**

Figures 43, 200–202

MACROPTEROUS MALE: Basic coloration light brown; pronotum, scutellum, mesepisterna and metepisterna, apex of labium, all tarsi, and genital segment dark brown; abdomen greenish.



FIGS. 48-50. *Leucophoropterini*. Fig. 48. *Karoocapsus pulchrus*, male (Rooinek Pass, Cape Province). Fig. 49. *Karoocapsus trifasciatus*, male, holotype. Fig. 50. *Tytthus parviceps*, male (Lyttelton, Pretoria, Transvaal).

Dorsum weakly shining, setiform hairs dark brown; head, pronotum, scutellum, and pleural region of prothorax rather densely covered with scale-like, sericeous hairs; antennal segment 1 with a few erect black spines on interior surface.

Vertex flat; antennal segment 2 about three-fourths diameter of segment 1, of nearly uniform diameter, segments 3 and 4 slightly greater than one-half diameter of segment 2; labium reaching metacoxae at trochanteral joint; anterior, lateral, and posterior pronotal margins weakly concave; calli indistinct; metatarsal segments 2 and 3 subequal in length, segment 1 about two-fifths length of segment 2.

MEASUREMENTS: Total length 4.64, maximum width 1.44, length head .28, width head .88, interocular space .32, length pronotum .40, width pronotum 1.66, length scutellum .72, width scutellum .88, length corium 2.40, length clavus 1.60, length cuneus .92, width cuneus .36, length claval commissure .92, distance apex commissure-apex membrane 2.48, length metatibia 2.36; length antennal segments 1—.38, 2—1.28, 3—1.06, 4—.34; length labial segments 1—.38, 2—.38, 3—.26, 4—.40.

MALE GENITALIA: Figures 200-202.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Grootfontein, Middelburg, October, M. Johannismeier (SANC).

PARATYPES: 4 macropterous ♂♂, same data as holotype (SANC, RTS).

This species is named for its uniform brown coloration.

Karoocapsus brunneus is unique among the known species of the genus in that it has uniformly dull brown hemelytra without yellow maculae.

***Karoocapsus flavomaculatus*, new species**

Figures 44, 206–207

MACROPTEROUS MALE: Basic coloration blackish brown; hemelytra brown with large yellowish maculae on clavus, posterior half of corium, and basal third of cuneus (Figure 44); tibiae and tarsi light brown; membrane smoky gray brown.

Setiform hairs on dorsum dark on dark background areas, light on light background areas; mesepisterna and metepisterna with scale-like sericeous hairs.

Posterior margin of vertex not carinate and rather poorly defined from cervical region; vertex weakly convex; antennal segment 2 about equal in diameter to segment 1, segments 3 and 4 about half diameter of segment 2; labium just surpassing posterior margin of mesosternum; pronotum with anterior margin weakly sinuate, posterior margin nearly straight; calli obscure; hemelytra widest at apex of corium; abdomen reaching middle of cuneus; metatarsal segment 2 slightly longer than segment 3, segment 1 about one-third length of segment 2.

MEASUREMENTS: Total length 4.56, maximum width 1.28, length head .40, width head .80, interocular space .32, length pronotum .52, width pronotum 1.08, length scutellum .60, width scutellum .80, length corium 2.24, length clavus 1.40, length cuneus .84, width cuneus .36, length claval commissure .88, distance apex commissure-apex membrane 2.40, length metatibia 2.72; length antennal segments 1—.38, 2—1.50, 3—1.00, 4—.22; length labial segments 1—.40, 2—.40, 3—.36, 4—.54.

MALE GENITALIA: Figures 206–207.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, near Doornbosch, S.A.M., 9:1961 (SAM).

This species is named for its possession of yellow hemelytral maculae.

Karoocapsus flavomaculatus is most easily confused with *K. trifasciatus*, but can be separated from it by the absence of a sub-

apical spine on the vesica (see also discussion under *K. middelburgensis*).

***Karoocapsus middelburgensis*, new species**

Figures 45, 203–205

MACROPTEROUS MALE: Basic coloration dark brown or brownish black; head below antennal bases and anterior to eyes, antennal segment 1, all femora, and all tibiae light brown; anterior half of cuneus and adjacent corium, posterior half of corium, and basal third of cuneus with yellowish maculae (Fig. 45); membrane dark smoky gray brown.

Setiform hairs on dorsum dark on dark background areas and light on light background areas; scutellum and mesoscutum along transverse impression, extreme base of corium, corium adjacent to posterior half of claval suture, cuneus basally, and mesepisterna and metepisterna with scale-like sericeous hairs.

Vertex slightly depressed; antennal segment 1 with one or two slender, erect, black spines on interior surface, segment 2 of slightly greater diameter distally than proximally, greatest diameter slightly less than that of segment 1, segments 3 and 4 about two-thirds diameter of segment 2; labium reaching to trochanteral joint of metacoxae; pronotum with posterior margin weakly concave; calli indistinct; hemelytra widest at midpoint of cuneus; abdomen just surpassing midpoint of cuneus; metatarsal segments 2 and 3 subequal in length, segment 1 about one-third length of segment 2.

MEASUREMENTS: Total length 4.88, maximum width 1.56, length head .30, width head .96, interocular space .36, length pronotum .44, width pronotum 1.18, length scutellum .76, width scutellum .96, length corium 2.44, length clavus 1.80, length cuneus .88, width cuneus .40, length claval commissure 1.00, distance apex commissure-apex membrane 2.60, length metatibia 2.96; length antennal segments 1—.32, 2—1.58, 3—1.00, 4—.54; length labial segments 1—.44, 2—.36, 3—.40, 4—.46.

MALE GENITALIA: Figures 203–205

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Grootfontein, Middelburg, October, M. Johannsmeier (SANC).

PARATYPES: *Cape Province*—7 macropterous ♂♂, Grootfontein, Middelburg, 3.XII.1965 (Schoombie); 1 macropterous ♂, *idem*, 18.3-65 (Johannsmeier); 3 macropterous ♂♂, *idem*, Mei 1965 (Johannsmeier); 1 macropterous ♂, *idem*, 15.X.65 (Schoombie) (SANC, JAS, RTS).

ADDITIONAL SPECIMENS: *Cape Province*—2 macropterous ♂♂, Oudtshoorn, Zebra, Mus. Exp., Oct. 1951 (SAM).

This species is named for Middelburg, Cape Province, the type locality of this and four other species of *Karoocapsus*.

Karoocapsus middelburgensis appears to be most closely related to *trifasciatus*, *flavomaculatus*, *pulchrus*, and *obscurus*. It can be separated from *pulchrus* by its much larger size, from *obscurus* by strongly contrasting light maculae, and from *flavomaculatus* and *trifasciatus* by the maculae on the posterior half of the corium reaching to the costal vein. Also the shape of the phallosome easily separates *middelburgensis* from *trifasciatus*, and the lack of the subapical spine on the vesica from *flavomaculatus*.

***Karoocapsus obscurus*, new species**

Figures 46, 208–210

MACROPTEROUS MALE: Hemelytra generally medium brown, remainder of body, antennae, coxae, trochanters, proximal third of all femora, and labium nearly black; clavus and posterior half of endocorium with obscure white maculae (Fig. 46); basal third of cuneus white; membrane smoky brown.

Setiform hairs on dorsum brown; scutellum and pleural areas of pronotum, and mesepisterna and metepisterna (more densely) covered with scale-like sericeous hairs.

Vertex nearly flat, posterior margin carinate laterally; antennal segment 2 of slightly smaller diameter than segment 1, segment 3 about one-half diameter of segment 2 (segment 4 missing in holotype); labium reaching trochanteral joint of mesocoxae; all pronotal margins nearly straight; calli indistinct; abdomen reaching middle of cuneus; metatarsal segment 1 about one-third length of segment 2, about one-half length of segment 3.

MEASUREMENTS: Total length 4.72, maximum width 1.72, length head .28, width head .84, interocular space .34, length pronotum .40, width pronotum 1.20, length scutellum .80, width scutellum .96, length corium 2.56, length clavus 1.76, length cuneus 1.00, width cuneus .40, length claval commissure .96, distance apex commissure-apex membrane 2.76, length metatibia 2.76; length antennal segments 1—.34, 2—1.60, 3—.98, 4—?; length labial segments 1—.44, 2—.42, 3—.30, 4—.46.

MALE GENITALIA: Figures 208–210.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Grootfontein, Middelburg, October, M. Johannsmeier (SANC).

PARATYPE: 1 macropterous ♂, same data as holotype (RTS).

This species is named for the indistinct nature of the hemelytral markings.

Karoocapsus obscurus is most easily separated from other members of the genus by the rather weakly contrasting and diffuse light markings of the hemelytra; all other species except *brunneus* have strongly contrasting, rather well defined markings. The vesica is similar to that of *flavomaculatus*.

***Karoocapsus occidentalis*, new species**

Figures 47, 211–213

MACROPTEROUS MALE: Basic coloration brownish black; antennal segment 1, profemora distally, all tibiae, and elongate streak adjacent to costal vein on posterior half of corium brown; complete broad transverse fascia on anterior half of corium, entire clavus, and basal two-fifths of cuneus white (Fig. 47); membrane dark smoky brown.

Setiform hairs on dorsum about as long as tibial diameter, light on light background areas, dark on dark background areas; pleural region of pronotum and mesepisterna and metepisterna with scale-like, sericeous hairs.

Vertex slightly depressed, posterior margin with low, broad, rounded carina medially; antennal segment 1 with slender erect spine on interior surface, segment 2 spindle-shaped, greatest diameter equal to that of segment 1, segments 3 and 4 slightly smaller in diameter than segment 2; labium reaching between mesocoxae and metacoxae; anterior margin of pronotum slightly depressed medially, with anterior margin almost obscured by "overhanging" region anterior to weakly defined calli; posterior margin of pronotum shallowly concave; hemelytra broadest at apex of corium; abdomen just surpassing apex of cuneus; metatarsal segments 2 and 3 subequal in length, segment 1 about two-fifths length of segment 2.

MEASUREMENTS: Total length approx. 4.50, maximum width 1.48, length head .30, width head .80, interocular space .36, length pronotum .52, width pronotum 1.28, length scutellum .72, width scutellum .88, length corium 2.20, length clavus 1.64, length cuneus .80, width cuneus .40, length claval commissure .84, distance apex commissure-apex membrane 2.10, length metatibia 2.60; length antennal segments 1—.28, 2—1.30, 3—.76, 4—?; length labial segments 1—.40, 2—.40, 3—.23, 4—.44.

MALE GENITALIA: Figures 211–213.

HOLOTYPE: Macropterous ♂, SOUTH WEST AFRICA: Hoffnung, 1,850 m., 26.i.1934, K. Jordan (BM[NH]).

PARATYPES: SOUTH WEST AFRICA—4 macropterous ♂♂, Kaross, Mus. Expd., Feb. 1925; 1 macropterous ♂, Windhoek, 19.1.1934 (Jordan) (SAM, BM[NH], RTS).

This species is named for its occurrence in western South Africa. See discussion under *bifasciatus*.

Karoocapsus pulchrus, new species

Figures 48, 214–216

MACROPTEROUS MALE: Stout bodied; basic coloration brownish black or black; antennal segment 1 yellow brown; clavus, posterior half of corium and basal third of cuneus with large yellow gold maculae (Fig. 48); membrane light smoky brown.

Dorsum polished, with black setiform hairs; corium, clavus adjacent to claval suture, and mesepisterna and metepisterna with scale-like sericeous hairs.

Vertex weakly convex, posterior margin with fine carina; antennal segment 1 with slender, erect, black spine on interior surface, segment 2 about equal to diameter of segment 1 over most of length, tapering to about two-thirds maximum diameter on proximal fifth, segments 3 and 4 about one-half diameter of segment 2; labium just attaining base of mesocoxae; posterior margin of pronotum straight; calli indistinct; lateral corial margins weakly sinuate, widest at apex; lateral cuneal margin convex; abdomen just attaining apex of cuneus; metatarsal segments 2 and 3 subequal in length, segment 1 about two-fifths length of segment 2.

MEASUREMENTS: Total length 4.32, maximum width 1.40, length head .44, width head 1.00, interocular space .48, length pronotum .68, width pronotum 1.32, length scutellum .60, width scutellum .80, length corium 1.96, length clavus 1.48, length cuneus .72, width cuneus .32, length claval commissure .80, distance apex commissure-apex membrane 1.80, length metatibia 2.64; length antennal segments 1—.30, 2—1.12, 3—.74, 4—.46; length labial segments 1—.36, 2—.36, 3—.26, 4—.30.

MALE GENITALIA: Figures 214–216.

BRACHYPTEROUS FEMALE: See discussion below.

FEMALE GENITALIA: Not examined.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Rooineck Pass, Mus. Expd., Oct. 1952 (SAM).

PARATYPES: 3 macropterous ♂♂, 1 brachyterous ♀, same data as holotype (SAM, RTS).

This species is named for its bright coloration.

The small size and stocky appearance in conjunction with the

shining black head and pronotum will separate *pulchrus* from other species of *Karoocapsus*. The yellow gold maculae occupy a relatively greater portion of the hemelytra than in *flavomaculatus*, *middelburgensis*, and *trifasciatus*, all of which have similar coloration.

A teneral specimen of *pulchrus* is available and suggests the structure assumed by all females of *Karoocapsus*. It differs from the male as follows: eyes smaller than in male, vertex relatively wider, frons more strongly convex; antennae inserted just below ventral margin of eyes, fossae removed from eyes by distance equal to diameter of segment one; pronotum nearly quadrangular, strongly swollen; hemelytra greatly reduced, undifferentiated, posterior margins broadly rounded, apex attaining abdominal sternite 4.

Additional single females from Citrusdal, Cape Province, deposited in the South African Museum, and 5 mi. N. Fouriesburg, Orange Free State, deposited in the J. A. Slater Collection, resemble the female of *pulchrus* in basic structure, but cannot be identified positively as members of *Karoocapsus* at the present time because they are not associated with male specimens.

***Karoocapsus trifasciatus*, new species**

Figures 49, 217–219

MACROPTEROUS MALE: Basic coloration brownish black; clavus and corium basally, posterior half of corium, and basal two-fifths of cuneus with large yellowish maculae (Fig. 49); membrane smoky brown.

Dorsum with dark, reclining setiform hairs and decumbent weakly shining hairs, the latter dark on dark background areas and light on light background areas; corium adjacent to claval commissure, pleural region of prothorax, mesepisterna and metepisterna, and abdominal sternite 4 with scale-like sericeous hairs.

Vertex flat, posterior margin with a weak carina; antennal segment 2 about equal in diameter to segment 1, segment 3 about two-thirds diameter of segment 2 (segment 4 missing in holotype); labium reaching between mesocoxae and metacoxae; posterior margin of pronotum shallowly concave; calli indistinct; hemelytra widest at apex of corium; abdomen not quite reaching apex of cuneus; metatarsal segments 2 and 3 subequal in length, segment 1 about one-third length of segment 2.

MEASUREMENTS: Total length 4.72, maximum width 1.56, length head .32, width head .92, interocular space .36, length pronotum .48, width pronotum 1.24, length scutellum .80, width scutellum 1.00, length corium 2.44, length clavus 1.88, length cuneus

.96, width cuneus .40, length claval commissure .96, distance apex commissure-apex membrane 2.44, length metatibia 3.00; length antennal segments 1—.30, 2—1.58, 3—1.00, 4—.62; length labial segments 1—.44, 2—.56, 3—.32, 4—.36.

MALE GENITALIA: Figures 217–219.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Grootfontein, Middelburg, 15.X.65, E. Schoobee (SANC).

PARATYPES: *Cape Province*—2 macropterous ♂♂, same data as holotype; 3 macropterous ♂♂, Grootfontein, Middelburg, October (Johannsmeier); 1 macropterous ♂, Deelfontein, 22 Oct. 1902; 2 macropterous ♂♂, *idem*, 25 Oct. 1902; 1 macropterous ♂, Uniondale District, Oct. 1952 (SANC, BM[NH], JAS, RTS).

This species is named for the three light maculae on the hemelytra.

See discussions under *middelburgensis* and *flavomaculatus*.

Tytthus Fieber

Tytthus Fieber, 1864, p. 82.

Although previously placed in the Phylini (Carvalho and Southwood, 1955), I am placing *Tytthus* in the Leucophoropterini on the basis of the following characters: 1) the parempodia are hair-like and parallel; 2) the vesica is U-shaped, not twisted, the gonopore is undeveloped; 3) the male genitalia are small relative to the total size of abdomen; 4) the right clasper is similar to *Karoocapsus*; and 5) the posterior wall is a simple sclerotized plate. The head is convex behind in *Tytthus*, whereas it is concave in most members of the tribe. *Tytthus* is not ant mimetic but does have a light-dark color pattern, which does not exist in most Phylini, and therefore suggests additional evidence for placement in the Leucophoropterini.

Tytthus includes 13 species. It is the only genus in the Leucophoropterini that occurs in the Western Hemisphere and the Palearctic.

Tytthus parviceps (Reuter)

Figure 50

Cyrtorhinus parviceps Reuter, 1890, p. 258.

Cyrtorhinus melanops Carvalho, Dutra, and Becker, 1960 (*nec* Reuter), pp. 459–460.

Tytthus parviceps can be recognized by the characters given in the generic discussion as well as by its basic facies (Fig. 50).

This species is widely distributed in the Ethiopian Region and

also occurs in the southern Palearctic, Florida, and the neotropics (Carvalho and Southwood, 1955).

Carvalho et al. (1960) incorrectly recorded specimens of this species from 10 miles north of Matatiele as *Cyrtorhinus melanops* Reuter.

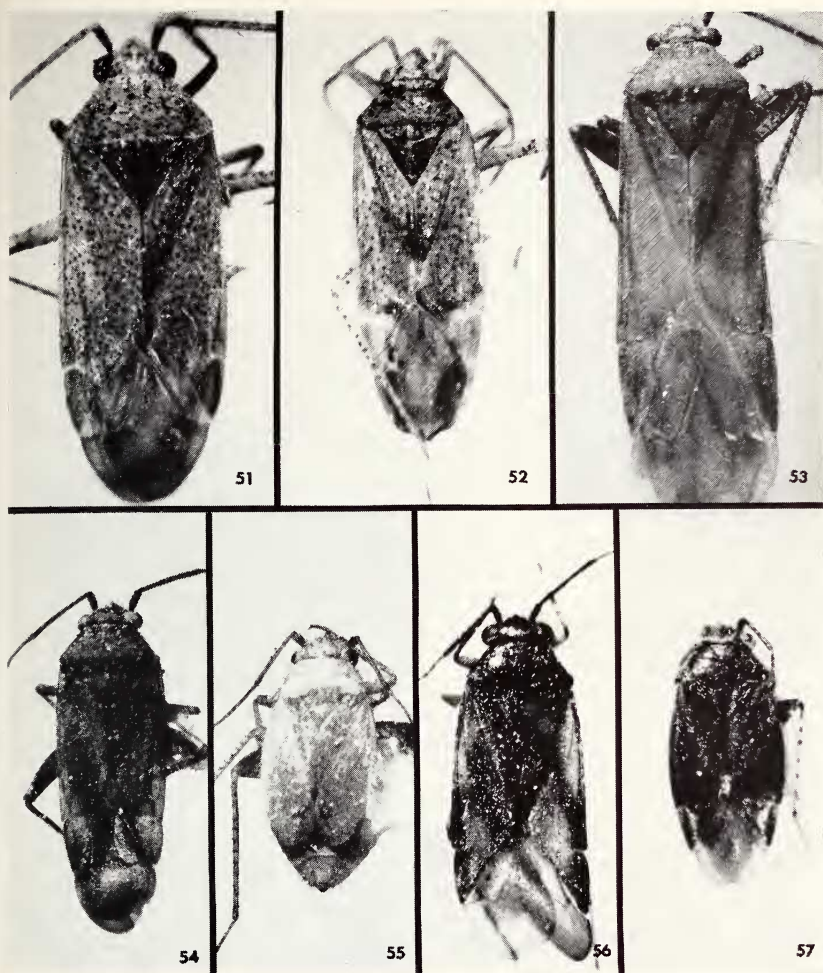
SPECIMENS EXAMINED: All specimens macropterous. *Cape Province*—1 ♂, 1 ♀, 10 mi. N. Matatiele, V.III.51 (Brinck and Rudebeck); 1 ♂, Rondvlei near Knysna, 8 Feb. 1968. *Natal*—1 ♂, Port Shepstone, 5.97. *Transvaal*—1 ♀, Lyttelton, 12 Jan. 1968, UV light; 4 ♂♂, 1 ♀, *idem*, 29 Feb. 1968; 1 ♀, Tzaneen, 11–16 Dec. 1963 (Capener); 2 ♂♂, 3 ♀♀, Zomerkomst, Politzi, 20–3–65 (Johannsmeier). *SOUTH WEST AFRICA*—3 ♂♂, 4 ♀♀, Caymeis, Mar. 1925 (SANC, SAM, LU, BM[NH], JAS, RTS).

TRIBE PHYLINI

Austropsallus, new genus

MACROPTEROUS MALE: Large, stout bodied, elongate or very elongate; coloration often mottled, usually with dark spots at the bases of setiform hairs on dorsum and femora; body surface smooth, dull; dorsum with curved, reclining, or semierect, setiform hairs (sometimes very long), and decumbent, wooly, sericeous pubescence; eyes conspicuously hairy; antennal segment 1 with decumbent pubescence and one or more erect, fine, black spines on interior or dorsal surface; antennal segments 2, 3, and 4 with rather dense, semierect or reclining, light or dark vestiture of length up to $2\frac{1}{2}$ times the diameter of segment of occurrence; thoracic pleura with wooly hairs as on dorsum; abdominal venter with reclining light hairs; tibiae usually with long dark spines with dark bases.

Head deflexed, clypeus prominent; eyes granular, moderately large, protuberant, reaching almost to gula; vertex sometimes with very low, rounded carina on posterior margin; antennae inserted slightly below middle of anterior margin of eyes, fossae contiguous with eyes; antennal segment 1 rather long, moderately enlarged, segment 2 about two-thirds diameter of segment 1, length $1\frac{1}{4}$ to nearly two times width of head across eyes, segments 3 and 4 subequal in diameter, about two-thirds diameter of segment 2, combined length roughly equal to length of segment 2; gula short, nearly horizontal; labium long, nearly attaining or surpassing mesocoxae; pronotum with anterior margin sinuate, finely carinate, upturned, lateral and posterior margins nearly straight; calli indistinct; pronotum inclined posteriorly; mesoscutum about one-third length of scutellum; mesoscutum and scutellum flattened, separated by dis-



FIGS. 51-57. Phylini. Fig. 51. *Austropsallus drakensbergensis*, male, holotype. Fig. 52. *Austropsallus helichrysi*, male, holotype. Fig. 53. *Austropsallus saniensis*, male, holotype. Fig. 54. *Austropsallus senecionus*, male, holotype. Fig. 55. *Austropsallus senecionus*, female (Sani Pass, 9400 ft., Lesotho). Fig. 56. *Capecapsus tradouwensis*, male, holotype. Fig. 57. *Capecapsus tradouwensis*, female (Doorn River, Cape Province).

tinct, transverse impression; lateral corial margins nearly straight; cuneal incisure shallow, fracture slightly angled anteromedially; membrane with two cells; abdomen reaching to about middle of cuneus; legs moderately long; only metatibiae with rows of tiny, closely spaced spines; metatarsal segment 1 about one-half length of segment 2, segments 2 and 3 subequal in length; claws moderately long, curved, broad basally; parempodia hair-like, parallel; pulvilli small.

MALE GENITALIA: Figures 220–234. Similar in structure to *Coatonocapsus*, *Capecapsus*, and *Odhiamboella*; left clasper in all species similar (Fig. 222), most highly modified in *A. middelburgensis* (Fig. 225); right clasper lanceolate; phallosome L-shaped, usually elongate apically (Fig. 221); vesica with two attenuated apical spiculi, usually bent in characteristic manner, sometimes forming complete coil (Fig. 226).

MACROPTEROUS FEMALE: Eyes slightly smaller and vertex relatively wider than in males; females of *A. senecionus* brachypterous (see species description).

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

TYPE SPECIES: *Austropsallus drakensbergensis*, new species.

This genus is named for its southern distribution in Africa and for its resemblance to the genus *Psallus*.

Austropsallus is probably most closely related to *Coatonocapsus*. It can be recognized by the generally long, erect, setiform hairs on the dorsum and antennae, the mottled and often spotted coloration, the uniform surface texture and coloration of the head, and the form of the male genitalia.

Single male specimens probably representing additional new species from those described below are known from Zoutpansberg, 5 mi. N. Louis Trichardt, Transvaal (deposited in the J. A. Slater Collection), and Sani Pass, 9400 ft., Lesotho (also in the J. A. Slater Collection).

KEY TO SPECIES OF *Austropsallus*

Macropterous specimens

1. Antennal segment 2 with erect, dark hairs about $2\frac{1}{2}$ times as long as diameter of segment; antennal segment 1, proximal half of segment 2, and entire dorsum with dark spots at bases of hairs *drakensbergensis* (Fig. 51)
- Antennal segment 2 with or without long, erect, dark hairs, never with dark spots; dorsum with or without dark spots 2
2. Very long, slender species, total length 5.44 mm., greatest width 1.72

mm.; antennal segment 2 with long, erect, dark hairs; dorsum sparsely covered with long, semierect, dark hairs with very small, dark bases; general coloration dingy green or light olive -----

----- *saniensis* (Fig. 53)

Species either small (5.00 mm. or less) or if over 5.00 mm., width relative to length much greater than in *saniensis*; vestiture and coloration variable ----- 3

3. Small species, length 3.52 mm.; dorsum nearly unicolorous blackish brown; entire body and appendages with long, heavy, black, setiform hairs ----- *senecionus* (Fig. 54)

Species larger than above, length over 4.50 mm.; body and appendages with moderately long, light colored hairs ----- 4

4. Dorsum with round, brown spots at bases of setiform hairs; tibiae with very long slender black spines with dark bases; length under 5.00 mm. ----- *helichrysi* (Fig. 52)

Dorsum either without spots or with spots only on clavus and posterior half of corium; length over 5.00 mm ----- 5

5. Membrane brown, including cells ----- *middelburgensis*

Membrane white with light brown cells ----- *albonotum*

***Austropsallus albonotum*, new species**

Figures 226-227

MACROPTEROUS MALE: Basic coloration greenish white; head mottled; anterior third of pronotum, mesoscutum, mesothoracic and metathoracic pleura, bases of procoxae, mesocoxae and metacoxae entirely, single row of spots on anterior surface of profemora and mesofemora, two rows of spots on anterior surface of metafemora, and irregularly placed spots on posterior surfaces of all femora brown; posterior half of corium and entire clavus with thickly placed, round, reddish spots; membrane generally white, cells reddish brown; antennae light brown, segment 1 with narrow brown band proximally; femora, tibiae, and tarsi nearly white; tibial spines obscurely dark at bases.

Setiform hairs on dorsum light on light background areas, dark on dark background areas; hairs on antennae and femora light.

Labium just surpassing metacoxae.

MEASUREMENTS: Total length 5.28, maximum width 1.88, length head .36, width head .92, interocular space .48, length pronotum .60, width pronotum 1.60, length scutellum .84, width scutellum 1.12, length corium 2.72, length clavus 2.00, length cuneus 1.00, width cuneus .44, length claval commissure 1.12, distance apex commissure-apex membrane 2.72, length metatibia 2.76; length antennal segments 1—.32, 2—1.44, 3—?, 4—?; length labial segments 1—.52, 2—.58, 3—.38, 4—.56.

MALE GENITALIA: Figures 226–227.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Grootfontein, Middelburg, October, M. Johannsmeier (SANC).

PARATYPES: 10 macropterous ♂♂, same data as holotype; 1 macropterous ♂, *idem*, 15.X.65 (Schoombee). *Transvaal*—2 macropterous ♂♂, Zomerkomst, Politzi, 20.3.65 (Johannsmeier) (SANC, JAS, RTS).

This species is named for its very light dorsal coloration.

Austropsallus albonotum is probably most closely related to *A. middelburgensis*. It can be recognized by the generally light dorsal coloration with the posterior half of the corium and the entire cuneus reddish (spotted) and with the membrane white and the cells light brown.

***Austropsallus drakensbergensis*, new species**

Figures 51, 220–222

MACROPTEROUS MALE: Basic coloration light reddish brown (see discussion); dorsum, antennal segment 1, proximal half of antennal segment 2, all femora, and all tibiae with numerous round brown spots; mesosternum and tarsal segment 3 black; thoracic pleura and most of abdomen yellow orange; membrane smoky brown, veins yellow orange.

Dorsum dull, antennae with a few, erect, very long brown hairs; femora and tibiae with black spines.

Labium just surpassing metacoxae.

MEASUREMENTS: Total length 4.64, maximum width 1.80, length head .28, width head .92, interocular space .40, length pronotum .82, width pronotum 1.60, length scutellum .80, width scutellum 1.04, length corium 2.52, length clavus 2.00, length cuneus .88, width cuneus .44, length claval commissure 1.00, distance apex commissure-apex membrane 2.20, length metatibia 2.48; length antennal segments 1—.36, 2—1.44, 3—.84, 4—.40; length labial segments 1—.60, 2—.60, 3—.30, 4—.50.

MALE GENITALIA: Figures 220–222.

MACROPTEROUS FEMALE: See generic discussion.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Natal*, Olivier-shoek Pass Summit, 5400 ft. el., 25 mi. S. Harrismith, 4 Mar. 1968, T. Schuh, J. A. & S. Slater, M. Sweet (Adults and nymphs on *Syncolostemon macranthus* [Guerke] Ashby) (SANC).

PARATYPES: 28 macrop. ♂♂, 16 macrop. ♀♀, same data as holotype (SANC, JAS, RTS).

ADDITIONAL SPECIMENS: All specimens macropterous. *Natal*—5 ♂♂, 1 ♀, 65 nymphs (in alcohol), same data as holotype; 1 ♂, 1 ♀, Natal Nat. Park, iii.1932 (Mackie); 1 ♂, 1 ♀, Port Shepstone, 5.97; 3 ♂♂, 3 ♀♀, V. Reenen. *Transvaal*—2 ♀♀, 5 nymphs (in alcohol), 13 mi. S. Barberton, 5300 ft. el., 24 Mar. 1968 (Adults and nymphs on *Hemizygia albiflora* [N.E. Br.] Ashby); 49 ♂♂, 25 ♀♀ (2 ♂♂, 52 nymphs—in alcohol), Mariepskop near Klaserie, 6300 ft., 30 Nov. 1967 (Adults and nymphs on *Hemizygia albiflora* [N.E. Br.] Ashby) (SANC, TM, BM[NH], HM, USNM, JAS, RTS).

This species is named for its general occurrence on the Drakensberg Escarpment.

Austropsallus drakensbergensis is probably most closely related to *A. helichrysi*. It can be recognized by the uniform covering of brown spots on the dorsum and the long hairs on the antennae with dark spots at the bases on segment 1 and the proximal half of segment 2. Most specimens are rusty orange in coloration, but the series from Mariepskop is dark purplish brown, and has therefore not been included in the paratype series even though the structural features, including the male genitalia, agree closely with the specimens treated as paratypes.

Known host plants are *Syncolostemon macranthus* (Guerke) (Labiateae) and *Hemizygia albiflora* (N.E. Br.) Ashby (Labiateae). The general coloration of the bugs usually agrees rather closely with the coloration of the flowers of the host plant.

***Austropsallus helichrysi*, new species**

Figures 52, 232–234

MACROPTEROUS MALE: Basic coloration light grayish green or yellow green; dorsum, femora, and tibiae covered with round brown spots; posterior margin of vertex and mesoscutum orange; scutellum and thoracic pleura brown; ostiolar peritreme white; all tarsal segments 3 black; abdomen very dark brown.

Dorsum dull; setiform hairs slender, dark; hairs on antennae and femora light; femora and tibiae with black spines.

Labium reaching almost to middle of abdomen.

MEASUREMENTS: Total length 4.52, maximum width 1.40, length head .30, width head .76, interocular space .36, length pronotum .44, width pronotum 1.20, length scutellum .64, width scutellum .80, length corium 2.12, length clavus 1.56, length cuneus .68, width cuneus .28, length claval commissure .88, distance apex commissure-apex membrane 1.88, length metatibia 2.00; length

antennal segments 1—.30, 2—1.06, 3—.66, 4—.32; length labial segments 1—.52, 2—.60, 3—.34, 4—.54.

MALE GENITALIA: Figures 232–234.

MACROPTEROUS FEMALE: See generic discussion.

HOLOTYPE: Macropterous ♂, LESOTHO: Sani Pass, 8000 ft., 10 Mar. 1968, J. Munting, S. Slater, T. Schuh, M. Sweet (Adults on *Helichrysum cooperi* [Harv.]) (SANC).

PARATYPES: 27 macropterous ♂♂, 29 macropterous ♀♀, same data as holotype (SANC, BM[NH], HM, USNM, SAM, JAS, RTS).

This species is named for the host genus, *Helichrysum*.

Austropsallus helichrysum is similar to *drakensbergensis*, but is smaller, basically greenish, and lacks dark spots on antennal segments 1 and 2.

The type locality is a subalpine region on the Drakensberg Escarpment in which the host plant, *Helichrysum cooperi* Harv. (Compositae), was growing in association with *Chrysocoma tenuifolium* Berg., *Geranium pulchrum* N.E. Br., and *Papaver aculeatum* Thunb.

***Austropsallus middelburgensis*, new species**

Figures 223–225

MACROPTEROUS MALE: Head and anterior third of pronotum cream; posterior two-thirds of pronotum grayish; mesoscutum orange; scutellum, corium, clavus, and lateral margin of cuneus light orangish brown to brown; cuneus anteriorly on mesial margin white, red between white area and brown lateral margin; membrane brown, veins nearly white; antennae, legs, and labium very light brown or cream; coxae generally brown; mesothoracic and metathoracic pleura and most of abdominal venter very dark brown; venter of abdomen sublaterally and apical half of genital capsule yellow orange; profemora and mesofemora with a few, metafemora with many, brown spots; tibial spines light brown, with or without obscure dark bases.

Dorsum dull; setiform hairs on dorsum and appendages light.

Labium just surpassing mesocoxae.

MEASUREMENTS: Total length 5.60, maximum width 2.00, length head .52, width head 1.12, interocular space .42, length pronotum .56, width pronotum 1.68, length scutellum .96, width scutellum 1.68, length corium 3.04, length clavus 2.20, length cuneus 1.08, width cuneus .48, length claval commissure 1.20, distance apex commissure-apex membrane 2.80, length metatibia 2.88; length antennal segments 1—.44, 2—1.52, 3—?, 4—?; length labial segments 1—.56, 2—.62, 3—.34, 4—.54.

MALE GENITALIA: Figures 223–225.

MACROPTEROUS FEMALE: See generic discussion.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Grootfontein, Middelburg, October, M. Johannsmeier (SANC).

PARATYPES: 10 macropterous ♂♂, 1 macropterous ♀, same data as holotype (SANC, JAS, RTS).

ADDITIONAL SPECIMENS: *Cape Province*—2 macropterous ♂♂, 2 macropterous ♀♀, Camps Bay, Cape Peninsula, Sept. 1920 (Turner) (BM[NH]).

Austropsallus middelburgensis has light antennal hairs as do *albonotum* and *helichrysi*, whereas in the remaining three species the antennal hairs are black. *A. middelburgensis* can be separated from *albonotum* by the generally brown membrane, and from *helichrysi* by its much larger size and lack of dark spots at the bases of the hairs on the dorsum.

The four specimens from Camps Bay, Cape Peninsula, have nearly identical male genitalia with the Middelburg series, but are much redder in dorsal coloration, and therefore are not included as paratypes.

***Austropsallus saniensis*, new species**

Figures 53, 229–231

MACROPTEROUS MALE: Very elongate; basic coloration light olive to yellowish; posterior margin of vertex, mesoscutum; postero-mesial margin of cuneus, and veins of membrane weakly orange; mesosternum, labial segment 4, all tarsal segments 3, bases of black hairs on dorsum and femora, and bases of spines on tibiae black.

Dorsum smooth, dull; setiform and wooly hairs on dorsum rather widely spaced; femora with some setiform black hairs.

Labium just surpassing apex of mesocoxae.

MEASUREMENTS: Total length 5.44, maximum width 1.72, length head .28, width head .84, interocular space .44, length pronotum .48, width pronotum 1.35, length scutellum .96, length corium 2.72, length clavus 1.84, length cuneus 1.08, width cuneus .32, length claval commissure 1.08, distance apex commissure-apex membrane 3.08, length metatibia 2.40; length antennal segments 1—.36, 2—1.24, 3—.84, 4—?; length labial segments 1—.46, 2—.44, 3—.26, 4—.34.

MALE GENITALIA: Figures 229–231.

Female unknown.

HOLOTYPE: Macropterous ♂, LESOTHO: Sani Pass, 10 Mar. 1968, 9400 ft., T. Schuh, M. Sweet, S. Slater, J. Munting (SANC).

This species is named for the type locality, the summit of the Sani Pass, Lesotho.

Austropsallus saniensis is the only known species in the genus with extremely long hemelytra and with scattered setiform hairs with tiny black spots at their bases on an otherwise rather uniformly colored dorsum (see also discussion under *A. senecionus*).

The type locality is an alpine region at the summit of the Sani Pass. At the time of my visit the area was badly overgrazed. The vegetation consisted mostly of grasses and very low-growing composites including species of *Helichrysum*, *Senecio*, and *Eumorphia*.

***Austropsallus senecionus*, new species**

Figures 54, 55, 228

MACROPTEROUS MALE: Basic coloration dull brown or blackish brown, very weakly suffused with green; femora heavily spotted with black; tibiae with black spots at bases of most spines; all tarsal segments 3 black; membrane dark smoky brown.

Setiform hairs on dorsum rather closely placed, without dark bases; antennae with many, very long, erect, black hairs; femora with rather dense reclining dark hairs and numerous reclining or semierect black setiform hairs, particularly on dorsal surface.

Labium just surpassing mesocoxae.

MEASUREMENTS: Total length 3.52, maximum width 1.20, length head .22, width head .70, interocular space .58, length pronotum .40, width pronotum 1.12, length scutellum .52, width scutellum .72, length corium 1.72, length clavus 1.20, length cuneus .64, width cuneus .28, length claval commissure .60, distance apex commissure-apex membrane 1.76, length metatibiae 1.72; length antennal segments 1—.24, 2—.82, 3—.50, 4—.34; length labial segments 1—.36, 2—.38, 3—.20, 4—.30.

MALE GENITALIA: Figure 228.

BRACHYPTEROUS FEMALE: Hemelytra reduced, apex of abdomen exposed; general coloration light green or yellow green; antennal segment 2 dark; antennal segments 3 and 4, labial segment 4, all tarsal segments 3, and extreme base and apex of ovipositor black; tibiae and femora without distinct black spots, bases of spines only very obscurely dark.

Body surface and vestiture as in male; long black setiform hairs of dorsum, black tibial spines, and black hairs on antennae giving very spiny appearance.

Eyes relatively small, weakly protuberant; vertex convex, pos-

terior margin nearly straight, ecarinate; frons strongly convex; antennae inserted at level of ventral margin of eyes, fossae slightly removed from anterior margins of eyes; labium just surpassing metacoxae; pronotum almost flat, anterior and lateral margins nearly straight, posterior margin weakly sinuate; mesoscutum and scutellum flat; cuneus and membrane greatly reduced, membrane not projecting posteriorly past apex of cuneus; lateral margins of hemelytra including cuneus evenly convexly rounded, nearly conforming to lateral abdominal margins; apical 2 abdominal segments almost completely exposed; legs relatively short.

MEASUREMENTS: Total length 2.76, maximum width 1.28, width head .72, interocular space .42.

FEMALE GENITALIA: See generic discussion.

HOLOTYPE: Macropterous ♂, LESOTHO: Sani Pass, 10 Mar. 1968, 9400 ft., T. Schuh, M. Sweet, S. Slater, J. Munting (Adults and nymphs on *Senecio achilleaefolius* DC.) (SANC).

PARATYPES: 6 macropterous ♂♂, 1 macropterous ♀, 24 brachypterous ♀♀, same data as holotype (SANC, JAS, RTS).

This species is named for the host genus, *Senecio*.

The smallest and most slender bodied species in the genus, *A. senecionus* most closely resembles *saniensis* in coloration and form of the dorsal vestiture, especially in that *senecionus* lacks spots at the bases of the setiform hairs and *saniensis* has only very small spots. The two species can be easily separated because *senecionus* is small and does not have the long hemelytra relative to the total body length as found in *saniensis*. *A. senecionus* is at present the only species in the genus for which brachypterous females are known, but females of this species are also known in the macropterous form. The females of *senecionus* are reminiscent of *Ellenia obscuricornis* in general shape and coloration, but the pretarsal structures are much different, and the females of *senecionus* are usually brachypterous whereas no brachypterous specimens of *Ellenia* are known (see also discussion under *Coatonocapsus*).

The host plant of this species is *Senecio achilleaefolius* DC. (Compositae) (see discussion under *A. saniensis*).

Brachycranella Reuter

Brachycranella Reuter, 1905c, p. 19.—Wagner, 1965, p. 83.

Only a single species, from South West Africa, is currently placed in *Brachycranella*. Wagner (1965) discussed the relationship of *Brachycranella* to *Atomoscelis* and other allied genera in the Pale-

arctic. Reuter (1905c) related *Brachycranella* to *Tuponia* Reuter. Poppius (1914a) keyed the genus out with *Leptoxanthus* at the end of his key to the Phylinae, considering both genera to lack "arolia".

***Brachycranella viridipunctata* (Stål)**

Capsus (*Eurymerocoris*) *viridipunctata* Stål, 1858, p. 317.

Brachycranella viridipunctata: Carvalho, Dutra, and Becker, 1960, pp. 451-452.

The identity and relationships of *Brachycranella viridipunctata* must await examination of the holotype which is probably in the Stockholm Museum. The type locality of the species, "Territorium fluvii Svakop", is at about 22-23° S. latitude in South West Africa. Carvalho et al. (1960) recorded this species from Ladismith, Cape Province.

Capecapsus, new genus

MACROPTEROUS MALE: Elongate, parallel sided; head between and below antennae, including clypeus, juga, and lora, black, highly polished, shining; entire body smooth; dorsum with moderately dense, reclining, dark, setiform hairs and decumbent, flattened, wooly, sericeous hairs; antennal segment 1 with decumbent dark hairs and an erect, dark spine on interior surface; antennal segments 2, 3, and 4 with dense vestiture of decumbent short hairs and longer reclining hairs about the length of diameter of antennal segment 2; thoracic pleura and most of abdominal venter with decumbent, wooly, sericeous hairs similar to those on dorsum; femora with decumbent hairs; tibiae and tarsi with inconspicuous decumbent hairs; tibiae with semierect black spines about the length of tibial diameter.

Head declivous; clypeus just visible from above; eyes moderately large, protuberant, contiguous with anterior margin of pronotum, reaching almost to gula ventrally, anterior margins weakly sinuate; antennae inserted just above ventral margin of eyes, fossae contiguous with eyes; antennal segment 1 moderately enlarged, segment 2 increasing very slightly in diameter distally to diameter nearly equal to that of segment 1; antennal segments 3 and 4 subequal in diameter, about three-fourths diameter of segment 2; bucculae small; gula obsolete; pronotum broad, flattened; scutellum weakly convex; hemelytra nearly parallel sided; cuneal incisure distinct; membrane with 2 cells; only metatibiae with longitudinal rows of tiny, closely spaced spines; tarsal claws moderately long, gently curved; parempodia weakly fleshy, convergent apically, reaching just past midpoint of claw; pulvilli minute.

MALE GENITALIA: Figures 235–237. Vesica similar in structure to *Coatonocapsus* and *Odhiamboella*, with complete coil and single attenuated apical spine; gonopore subapical, well developed; claspers and phallosome typical of the Phylini.

BRACHYPTEROUS FEMALE: See *C. tradouwensis*.

FEMALE GENITALIA: Not examined.

TYPE SPECIES: *Capecapsus tradouwensis*, new species.

This genus is named for its occurrence in the Cape Province of South Africa.

Capecapsus appears to be most closely related to *Coatonocapsus*, based on its general facies, polished frons below the antennae, sexual wing dimorphism, and the form of the male genitalia; the fleshy convergent parempodia and unicolorous dorsum will separate *Capecapsus* from *Coatonocapsus*. The polished frons relates *Capecapsus* to *Ellenia* which also has fleshy convergent parempodia; the relationship between the two genera does not appear to be particularly close on the basis of the male genitalia, however. *Capecapsus* is also similar to *Odhiamboella* in general facies and structure of the vesica, but the type of vestiture is very different.

***Capecapsus tradouwensis*, new species**

Figures 56, 57, 235–237

MACROPTEROUS MALE: Basic coloration dark brown; membrane smoky brown; all femora distally, and tibiae, yellowish, with numerous brown spots.

Posterior margin of vertex nearly straight with distinct carina; labium just surpassing procoxae; pronotum depressed on either side of midline behind weak calli, anterior margin weakly sinuate, lateral margins shallowly concave, posterior margin nearly straight; cuneal fracture slightly angled anteromedially; abdomen reaching to about middle of cuneus; metatarsal segment 1 slightly less than one-half length of segment 2, segments 2 and 3 subequal in length.

MEASUREMENTS: Total length 3.72, maximum width 1.36, length head .24, width head .80, interocular space 3.72, length pronotum .44, width pronotum 1.16, length scutellum .52, width scutellum .72, length corium 1.80, length clavus 1.40, length cuneus .80, width cuneus .36, length claval commissure .80, distance apex commissure–apex membrane 1.72, length metatibia 1.56; length antennal segments 1—.24, 2—.76, 3—.34, 4—.26; length labial segments 1—.26, 2, 3, and 4—.40.

MALE GENITALIA: Figures 235–237.

BRACHYPTEROUS FEMALE: Ovoid, stout bodied; general coloration, surface texture and pubescence as in macropterous male.

Eyes slightly smaller than in male, vertex relatively wider; posterior margin of vertex sinuate; pronotal calli slightly raised, widely separated medially; scutellum nearly flat; hemelytra broadly rounded laterally, short, just surpassing apex of abdomen.

MEASUREMENTS: Total length 3.40, maximum width 1.28, width head .74, interocular space .40.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Tradouw Pass, Swellendam Dist., Mus. Expd., Nov. 1925 (SAM).

PARATYPES: *Cape Province*—3 macropterous ♂♂, same data as holotype; 1 macropterous ♂, 48 mi. E. Barrydale, XI-31-1966 (Rozen); 2 macropterous ♂♂, 4 brachypterous ♀♀, Doorn River, XI.1931 (Ogilvie) (SAM, AMNH, RTS).

This species is named for the Tradouw Pass.

As the only species in the genus, *C. tradouwensis* can be separated from other South African Phylinae by the characters given in the generic discussion and by the structure of the male genitalia.

Coatonocapsus, new genus

MACROPTEROUS MALE: Relatively small; elongate, nearly parallel sided; coloration sombre, mottled or spotted; body surface smooth, dull; head below level of dorsal margin of antennal fossae (including clypeus, lora, and juga) highly polished (usually black); dorsum with reclining or erect dark setiform hairs and decumbent, wooly, sericeous hairs; eyes with very short hairs; antennae with dense, reclining light vestiture about as long as diameter of antennal segment 1 and usually with some longer, fine, semierect hairs; antennal segment 1 with slender, erect, black spine on interior surface; thoracic pleura and abdomen lateroventrally with wooly hairs as on dorsum; abdomen medially and posteriorly with reclining light hairs; femora with reclining hairs and some fine spines; tibiae and tarsi with fine reclining hairs and some reclining or semierect black spines about as long as $1\frac{1}{2}$ times tibial diameter.

Head declivous; eyes moderately large, protuberant, weakly granular, nearly confluent with anterior margin of pronotum; vertex weakly convex, posterior margin nearly straight, ecarinate; frons convex, transversely rugose; anterior margins of eyes weakly emarginate; antennae inserted at just below level of ventral margin of eyes, fossae contiguous with eyes; antennal segment 1 moderately enlarged, segment 2 tapering slightly proximally or nearly cylin-

drical, greatest diameter slightly less than diameter of segment 1, segments 3 and 4 about two-thirds diameter of segment 2; bucculae very slightly enlarged; gula about as long as diameter of antennal segment 1, inclined; apex of labium reaching or surpassing base of mesocoxae; pronotum flattened, only slightly inclined posteriorly; calli weak, rather widely separated medially; pronotum with anterior margin finely carinate, upturned, weakly sinuate, lateral margins nearly straight, weakly convergent anteriorly, posterior margin straight or shallowly excavated across flat mesoscutum; mesoscutum one-quarter to one-third length of flat scutellum, separated from the latter by shallow, transverse impression; lateral corial margins weakly convexly rounded; cuneal incisure shallow or obsolete, fracture slightly angled anteromedially; membrane with 2 cells; abdomen reaching to about middle of cuneus; legs moderately long; only metatibiae with longitudinal rows of tiny, closely-spaced spines; metatarsal segment 1 about one-third length of segment 2, segment 3 about three-fourths length of segment 2; claws very long, slender, weakly curved, only slightly broadened basally; parempodia hair-like, parallel; pulvilli minute.

MALE GENITALIA: Figures 238–244. Vesica similar in structure to *Odhamboella* and *Capecapsus*, with a single coil and apically with one or two attenuated spines subtended by well developed gonopore; structure of claspers and phallosome relatively constant, but left clasper in *C. transvaalensis* with a thorn-like projection dorsally.

BRACHYPTEROUS FEMALE: See *Coatonocapsus sweeti*.

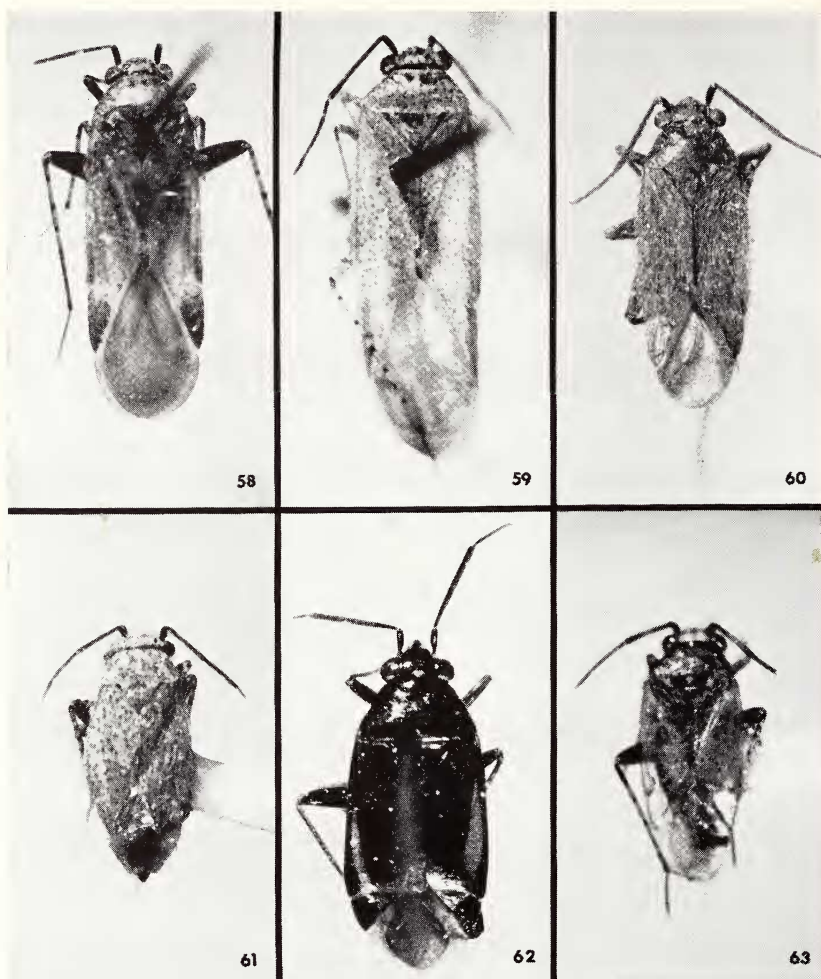
FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

TYPE SPECIES: *Coatonocapsus sweeti*, new species.

This genus is named in honor of Dr. W. G. H. Coaton, Head, Systematic Entomology, Plant Protection Research Institute, Pretoria, whose encyclopedic knowledge of South Africa helped make much of the field work for this project a success.

Coatonocapsus rather closely resembles certain species of *Austropsallus*, particularly *A. senecionus*, by virtue of the black setiform hairs on the dorsum, the spotted femora and tibiae, and the general body form. *Coatonocapsus* differs from *Austropsallus* by having only short to moderately long reclining hairs on the antennae, by having the clypeus, juga, and lora shining black, and by having the vesica characteristically curved (Fig. 238) (see also discussions under *Austropsallus* and *Capecapsus*).

A male specimen, probably representing a new species of *Coatonocapsus* in addition to those described below, is known from Grootfontein, Middelburg, Cape Province (deposited in South African



FIGS. 58-63. Phylini. Fig. 58. *Coatonocapsus johannsmeieri*, male, holotype. Fig. 59. *Coatonocapsus pallidus*, male, holotype. Fig. 60. *Coatonocapsus sweeti*, male, holotype. Fig. 61. *Coatonocapsus sweeti*, female (Sani Pass, 9400 ft., Lesotho). Fig. 62. *Denticulophallus adenandrae*, male, holotype. Fig. 63. *Ellenia obscuricornis*, male (Sani Pass, 9400 ft., Lesotho).

National Collection of Insects). Also known is a female from Cape Town, deposited in the South African Museum, which somewhat resembles *C. pallidus*; this specimen is brachypterous.

KEY TO SPECIES OF *Coatonocapsus*

Macropterous males

1. Basic coloration light yellow green; setiform hairs on dorsum with small brown spots at bases; labium reaching between procoxae and mesocoxae *pallidus* (Fig. 59)
 Coloration brown or nearly black; dorsum heavily spotted with dark brown or black; labium surpassing mesocoxae 2
2. Large species, length 4.80 mm *transvaalensis*
 Smaller species, length under 4.00 mm 3
3. Head, pronotum, scutellum, and antennae black or nearly so; lateral corial margins weakly convex *sweeti* (Fig. 60)
 Head, pronotum, and scutellum brown, mottled with black; antennal segment 2 brown; lateral corial margins straight
 *johannsmeieri* (Fig. 58)

***Coatonocapsus johannsmeieri*, new species**

Figures 58, 241

MACROPTEROUS MALE: Basic coloration dull brown mottled with dark brown and black; transverse rugosities of frons, vertex around eyes and on posterior margin, pronotal calli, mesoscutum (except lateral margins), and midline of scutellum black; all setiform hairs with brown spots at bases; antennal segment 1 and all tarsi dark brown; clypeus, apex of juga, lora, and labium dark brown, shining; mesothoracic and metathoracic pleura, mesosternum, and abdomen dark brown (appearing pruinose); femora and tibiae yellow brown, femora heavily spotted with black; tibiae with black spots at bases of spines.

Labium just reaching metacoxae at trochanteral joint; posterior margin of pronotum shallowly excavated.

MEASUREMENTS: Total length 3.80, maximum width 1.28, length head .20, width head .76, interocular space .40, length pronotum .36, width pronotum 1.04, length scutellum .60, width scutellum .72, length corium 1.88, length clavus 1.28, length cuneus .76, width cuneus .24, length claval commissure .72, distance apex commissure-apex membrane 1.92, length metatibia 1.68; length antennal segments 1—.28, 2—.90, 3—?, 4—?; length labial segments 1—.36, 2—.28, 3—.32, 4—.30.

MALE GENITALIA: Figure 241.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Grootfontein, Middelburg, October, M. Johannsmeier (SANC).

PARATYPES: 3 macropterous ♂♂, same data as holotype (SANC, RTS).

This species is named for the collector, M. Johannsmeier.

Coatonocapsus johannsmeieri is similar in coloration to *transvaalensis* but is much smaller and has the hemelytra shorter relative to the total length of the body. It is much lighter and more elongate than *sweeti*, and much darker than *pallidus*.

***Coatonocapsus pallidus*, new species**

Figures 59, 242

MACROPTEROUS MALE: Basic coloration light yellow green; head with an orangish tinge; all setiform hairs on dorsum with small, round, brown spots at bases; vertex mottled with brown; clypeus, apex of juga and lora, antennae, labium, coxae, mesoscutum, abdomen (basal half greenish), and tarsi brown; femora with many small, round, brown spots; tibiae with dark brown spots at bases of spines.

Labium reaching between procoxae and mesocoxae; posterior margin of pronotum straight.

MEASUREMENTS: Total length 4.40, maximum width 1.44, length head .24, width head .80, interocular space .40, length pronotum .48, width pronotum 1.20, length scutellum .44, width scutellum .72, length corium 2.04, length clavus 1.44, length cuneus 1.00, width cuneus .32, length claval commissure 1.00, distance apex commissure-apex membrane 2.20, length metatibia 1.92; length antennal segments 1—.30, 2—.98, 3—.66, 4—.30; length labial segments 1—.30, 2—.28, 3—.12, 4—.20.

MALE GENITALIA: Figure 242.

BRACHYPTEROUS FEMALE: Coloration, body surface texture, and vestiture as in male; abdomen yellow green; ovipositor brown.

Structurally very similar to female of *C. sweeti*.

FEMALE GENITALIA: See generic discussion.

MEASUREMENTS: Total length 3.08, maximum width 1.32, width head .78, interocular space .40.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, East of Pakhuis Pass, Mus. Expd., Sept. 1947 (SAM).

PARATYPES: *Cape Province*—1 macropterous ♂, 4 brachypterous ♀♀, Doorn River, XI.1931 (Mackie); 12 brachypterous ♀♀, Michells Pass, Ceres Div., Oct. 1934; 1 macropterous ♂, R. Sonder

End, Oudebosch, 1500 ft., Nov.—Dec. 1928 (Barnard); 1 brachypterous ♀, Swartbergen, Nov. 1935 (SAM, BM[NH], RTS).

This species is named for its light coloration.

Coatonocapsus pallidus can be separated from other members of the genus by its light green coloration, small brown spots on the dorsum, and short labium.

***Coatonocapsus sweeti*, new species**

Figures 60, 61, 243, 244

MACROPTEROUS MALE: Basic coloration dull black; hemelytra dull dark brown, with diffuse black spots at bases of setiform hairs; posterior margin of vertex and lateral margins of mesoscutum orange; ostiolar peritreme, margin of pleural region of prothorax, and margin of bucculae dull white; labium, femora, and tibiae generally brown; labium infusate apically; femora heavily spotted with black, tibiae with black bands formed by black bases of spines.

Labium just surpassing mesocoxae; posterior margin of pronotum shallowly excavated.

MEASUREMENTS: Total length 3.20, maximum width 1.20, length head .28, width head .76, interocular space .40, length pronotum .40, width pronotum 1.00, length scutellum .48, width scutellum .60, length corium 1.60, length clavus 1.20, length cuneus .52, width cuneus .25, length claval commissure .76, distance apex commissure-apex membrane 1.36, length metatibia 1.68, length antennal segments 1—.32, 2—.88, 3—.50, 4—.28; length labial segments 1—.36, 2—.34, 3—.20, 4—.26.

MALE GENITALIA: Figures 243, 244.

BRACHYPTEROUS FEMALE: Small, stout bodied, ovoid; hemelytra just covering abdomen; general coloration dull yellow green; dorsum with numerous round black spots at bases of setiform hairs; antennae, clypeus, apex of juga, lora, and labium black; coxae and tarsi nearly black; femora and tibiae dull yellowish with heavy black spots.

Body surface and vestiture as in macropterous male.

Head broad; width across eyes nearly equal to width of posterior margin of pronotum; vertex broad, convex, posterior margin nearly straight, ecarinate; eyes smaller than in male, protuberant, leaving genae exposed ventrally; antennal fossae slightly removed from margins of eyes; apex of labium reaching to base of ovipositor; pronotum with anterior margin nearly straight, lateral margins nearly parallel, posterior margin very shallowly excavated; lateral corial margins convex; cuneus and membrane forming broadly rounded posterior margin of hemelytra; membrane greatly reduced.

MEASUREMENTS: Total length 2.60, maximum width 1.12, width head .72, interocular space .40.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

HOLOTYPE: Macropterous ♂, LESOTHO: Sani Pass, 10 Mar. 1968, 9400 ft., T. Schuh, M. Sweet, S. Slater, J. Munting (Adults and nymphs on *Eumorphia sericea* Wood and Evans) (SANC).

PARATYPES: 39 macropterous ♂♂, 44 brachypterous ♀♀, same data as holotype (SANC, TM, SAM, BM[NH], HM, JAS, RTS, USNM).

ADDITIONAL SPECIMENS: 15 nymphs (in alcohol), same data as holotype (RTS).

This species is named for Dr. Merrill H. Sweet, who first discovered it in the field and established the identity of the host plant.

Coatonocapsus sweeti is the smallest known species in the genus. It is nearly black, whereas all other species are distinctly brown or green. *C. sweeti* appears to be most closely related to *johannismeieri*.

This species is known only from the type locality on *Eumorphia sericea* Wood and Evans (Compositae) (see also discussion under *Austropsallus saniensis*).

***Coatonocapsus transvaalensis*, new species**

Figures 238–240

MACROPTEROUS MALE: Basic coloration brown; dorsum with large dark brown spots at bases of setiform hairs; head weakly orange; antennal segments 1, 3, and 4, clypeus, apex of juga, lora, mesothoracic and metathoracic pleura and sterna, and abdominal venter dark brown; antennal segment 2, labium basally, coxae, pleural region of prothorax, and prothoracic sternum light brown; coxae mottled with dark brown, labium black apically; femora and tibiae light yellow brown; femora heavily spotted with black; tibiae with narrow bands formed by black bases of spines.

Labium just surpassing mesocoxae; posterior margin of pronotum nearly straight.

MEASUREMENTS: Total length 4.80, maximum width 1.68, length head .24, width head .88, interocular space .40, length pronotum .44, width pronotum 1.28, length scutellum .72, width scutellum .92, length corium 2.56, length clavus 1.66, length cuneus 1.04, width cuneus .40, length claval commissure 1.00, distance apex commissure-apex membrane 2.08, length metatibia 2.32; length antennal segments 1—.32, 2—1.16, 3—.84, 4—.36; length labial segments 1—.40, 2—.40, 3—.24, 4—.40.

MALE GENITALIA: Figures 238–240.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Zomerkomst, Politzi, 20.3.65, M. Johannismeier (SANC).

PARATYPES: 2 macropterous ♂♂, same data as holotype (SANC, RTS).

This species is named for its occurrence in the Transvaal.

Coatonocapsus transvaalensis is the largest known species in the genus, and in size could only be confused with *pallidus* which is light green whereas *transvaalensis* is mottled brown. *C. transvaalensis* has very long hemelytra relative to the total length of the body and also has a relatively long second antennal segment.

Denticulophallus, new genus

MACROPTEROUS MALE: Body thickset, elliptical; dorsum polished, shining, with heavy, semierect, black setiform hairs about as long as metatibial diameter; pronotum weakly transversely rugose; antennal segment 1 with decumbent black hairs and a few erect, slender, black spines, segment 2 with semierect black hairs about as long as diameter of segment 3, segments 3 and 4 with fine, decumbent, black hairs; all femora, tibiae, and tarsi with short, reclining, heavy, black hairs.

Head declivous; clypeus prominent as viewed from above; eyes contiguous with anterior margin of pronotum, occupying sides of head ventrally to gula; antennae inserted at level of ventral margin of eyes, fossae slightly removed from anterior margins of eyes; antennal segment 1 slightly enlarged, segment 2 narrowed proximally, increasing in diameter distally to about diameter of segment 1, segments 3 and 4 slightly smaller than proximal diameter of segment 2; bucculae well developed; pronotum nearly flat longitudinally, slightly inclined posteriorly; mesoscutum and scutellum nearly flat; lateral margin of corium weakly convex; cuneus and membrane strongly deflexed; cuneal incisure shallow; membrane with two cells, all tibiae with black semierect spines about as long as tibial diameter, without rows of tiny closely-spaced spines; claws broadened basally; parempodia hair-like, parallel; pulvilli large, fleshy, flattened, just reaching apex of claws and free from claws except at base.

MALE GENITALIA: Figure 245–247. Vesica U-shaped, twisted, apex with several attenuated spines and recurved teeth, gonopore subapical; phallosome and claspers typical of Phylini.

MACROPTEROUS FEMALE: Structure very similar to male.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

TYPE SPECIES: *Denticulophallus adenandrae*, new species.

This genus is named for the structure of the vesica of the type species.

Denticulophallus appears to be most closely related to *Macrotylus*, at least in the structure of the pulvilli and the general body form, including the prominent clypeus. It is, however, very distinct by virtue of the shining black body, the heavy, black, setiform hairs on the dorsum, and the peculiar structure of the vesica.

***Denticulophallus adenandrae*, new species**

Figures 62, 245–247

MACROPTEROUS MALE: Generally black, shining; all coxae, all tibiae distally, and antennal segment 4 distally, brown.

Hemelytral surface slightly irregular, less highly polished than remainder of body; eyes with scattered short hairs.

Vertex weakly convex, posterior margin ecarinate; labium just surpassing mesocoxae at trochanteral joint; all pronotal margins nearly straight; calli poorly defined; cuneal fracture angled anteromedially; inner apical margin of large cell of membrane broadly rounded; abdomen just surpassing apex of cuneus in male (nearly reaching apex of membrane in female); metatarsal segments 1 and 2 subequal in length, segment 3 about $1\frac{1}{2}$ times length of segment 2.

MEASUREMENTS: Total length 3.48, maximum width 1.48, length head .32, width head .80, interocular space .36, length pronotum .56, width pronotum 1.24, length scutellum .56, width scutellum .84, length corium 1.76, length clavus 1.32, length cuneus .60, width cuneus .28, length claval commissure .68, distance apex commissure-apex membrane 1.40, length metatibia 1.82; length antennal segments 1—.24, 2—.92, 3—.54, 4—.34; length labial segments 1—.52, 2—.52, 3—.32, 4—.32.

MALE GENITALIA: Figures 245–247.

MACROPTEROUS FEMALE: Very similar to macropterous male.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Vergelegen, Somerset West, 8/11/1964, F. W. and S. K. Gess (on flowers of *Adenandra umbellata* Willd. (Rutaceae)) (SAM).

PARATYPES: 3 macropterous ♂♂, 5 macropterous ♀♀, same data as holotype (SAM, JAS, RTS).

ADDITIONAL SPECIMENS: *Cape Province*—1 macropterous ♂, Ceres, Nov. 1920 (Turner) (BM[NH]).

This species is named for the host genus, *Adenandra*.

See generic discussion.

Most known specimens of *Denticulophallus adenandrae* were taken on *Adenandra umbellata* Willd. (Rutaceae). The host genus is endemic to the Southwest Cape (Phillips, 1951).

Ellenia Reuter

Ellenia Reuter, 1910a, p. 168.

Carvalho (1952a) placed *Ellenia* in the Orthotylini. The structure of the pretarsus and male and female genitalia, however, militate for placement in the Phylini.

Ellenia is most closely related to *Psallus*, but can be separated from it by the presence of a longitudinal keel on the male genital capsule and its highly polished, shining black clypeus, juga, and lora. The parempodia are similar in structure to those described by Wagner (1961) for *Chinacapsus* Wagner, being only slightly thickened and convergent apically rather than strongly flattened and recurved as in the Orthotylinae and Pilophorini.

MALE GENITALIA: Figures 248–250. Vesica short, S-shaped, strongly twisted; left clasper and phallosome characteristic of Phylinae.

Ellenia was originally described from South America with a single included species. The genus at present also includes approximately ten species from Africa and one from Formosa.

The genus *Melanotrichiella* Poppius was synonymized with *Ellenia* by Carvalho (1952a), but this action is almost certainly incorrect. I have examined what is probably the only available specimen of the genus, the holotype female of *M. annulicornis* Poppius, which is deposited in the Helsinki Museum (Type No. 11891). It differs from *Ellenia* by having the head entirely unicolorous and of uniform surface texture, having antennal segment 2 about one-third longer than the width of the head, and having antennal segment 3 about three-fourths as long as segment 2. The legs are missing from the holotype of *annulicornis*, so the parempodia cannot be examined. The ratio of the lengths of antennal segments 2 and 3 is very much different than that found in most Phylini, including *Ellenia*, and suggests a relationship to the Orthotylini. Confirmation of this will have to await the availability of more specimens so that the parempodia and the male and female genitalia can be examined.

Carvalho (1948) redescribed *Ellenia cuneata* (Stål) with a dorsal view illustration and figures of the male genitalia. Apparently he figured the vesica of a mirid other than *cuneata* because the drawing definitely represents the phallus of an orthotyline and not that of *cuneata*, even though the figures of the claspers seem to be correct.

***Ellenia obscuricornis* (Poppius)**

Figures 63, 248–250

Marshalliella obscuricornis Poppius, 1914a, p. 76.*Psallus tenebrosus* Odhiambo, 1959b, pp. 516–518, 541. **New Synonymy.***Psallus labeculus* Odhiambo, 1959b, pp. 518–521, 541. **New Synonymy.***Ellenia obscuricornis* Carvalho, Dutra, and Becker, 1960, pp. 460–461.

Ellenia obscuricornis (Poppius) is one of the most common and widespread members of the Phylinae in South Africa and is the only species in the genus known from the region. It can be recognized by the characters given in the generic discussion and by its generally light green coloration (see also below) with dark spots at the bases of the setiform hairs (and on the femora and tibiae) and the structure of the male genitalia.

MEASUREMENTS: Macropterous ♂ (Sani Pass, 9400 ft.)—Total length 2.88, maximum width 1.24; macropterous ♀ (*idem*)—Total length 3.36, greatest width 1.32.

MALE GENITALIA: Figures 248–250.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

The range of variation in this species in South Africa is extreme. The males are usually much darker than the females, particularly the pronotum, mesoscutum, scutellum, and the thoracic and abdominal pleura. In some specimens the antennae are totally black. The long series from Lesotho, Sani Pass, at 8000 and 9400 feet, are particularly dark, the latter locality having uniformly darker specimens than the former. Also, two extremely dark specimens are known from Mariepskop, near Klaserie, Transvaal; these individuals key out in Poppius' key (1914a) to *Marshalliella kilimana* Poppius on the basis of the black antennae, but are actually only very dark specimens of *obscuricornis*. The specimens from the Oliphants River at Citrusdal are all very light green.

A single female specimen of *E. obscuricornis* is present in the Helsinki Museum and three males and one female are present in the British Museum (Natural History). All bear the labels "S. Rhodesia, Chirinda, 12.VII.1911, Swynnerton," and therefore must represent the cotype series examined by Poppius (1914a). I have selected a male in the British Museum as the lectotype and labeled it "LECTOTYPE *Marshalliella obscuricornis* Poppius, det. R. T. Schuh."

Psallus labeculus Odhiambo and *Psallus tenebrosus* Odhiambo (Odhiambo, 1959b) both have a keel on the male genital capsule as found in *Ellenia* and have the vesica identical with specimens of

E. obscuricornis from South Africa. The type specimens of both of these species resemble *obscuricornis* very closely, including the shining black area on the front of the head. They fit well within the range of variation of *obscuricornis* and I am therefore synonymizing them.

Host plant information on *obscuricornis* is incomplete, but the species may be restricted to the Compositae and possibly to the genus *Senecio*.

SPECIMENS EXAMINED: All specimens macropterous. **LESOTHO**—17 ♂♂, 31 ♀♀, 14 nymphs, Sani Pass, 9400 ft., 10 Mar. 1968 (Adults and nymphs on *Senecio burchelli* D.C.); 14 ♂♂, 22 ♀♀, 8 nymphs, *idem*, 8000 ft.; 2 ♀♀, Mamathes, 5 mi. ENE Teyateyaneng, 28.III.51, at light (Brinck and Rudebeck); 4 ♀♀, Quthing, 17.III.51 (Brinck and Rudebeck). **SOUTH AFRICA:** *Cape Province*—17 ♂♂, 68 ♀♀, 4 nymphs, Citrusdal, Oliphants River, 29 Jan. 1968 (Adults and nymphs on *Senecio angustifolius* [Thunb.] Willd.); 4 ♂♂, 4 ♀♀, Calvinia (Ogilvie); 2 ♂♂, Doorn River, XI.1931 (Mackie); 1 ♂, 5 ♀♀, 2 mi. S. Goukamma, Knysna, 8 Feb. 1968; 1 ♂, Base Michells Pass, 6 mi. SW Ceres, 27 Jan. 1968; 2 ♂♂, 2 ♀♀, Schoemannspoort, 10 mi. N of Oudtshoorn, 18 Nov. 1967 (Sweet); 1 ♂, Swellendam, at light, 14 Nov. 1967 (Sweet). *Natal*—1 ♂, Bergville, 17.I.1964 (Paliatseas); 1 ♂, Cathedral Peak, 2–3.IV.1954 (Vari); 1 ♀, Drakensberg, Cathedral Peak, ca. 6000 ft., 2.IV.1954, at light (Balfour-Browne); 1 ♂, Giants Castle Park, 5800 ft., 5 Mar. 1968, UV light trap; 1 ♀, Greytown, X.1931 (Ogilvie); 1 ♂, 3 ♀♀, Hilton; 1 ♀, Mont-aux-Sources, 4–6.IV.1954 (Vari); 2 ♀♀, *idem*, 8500–10,500 ft., 26.ii.1929 (Scott); 3 ♀♀, Natal National Park, iii.1932 (Mackie); 1 ♀, Port Shepstone, 5.97; 5 ♂♂, 1 ♀, Royal Natal National Park, Tendele Camp, 5 March 1968, UV light trap; 5 ♂♂, 26 ♀♀, Sea Park, Durban, VII-1950 (Capener); 4 ♂♂, 4 ♀♀, Weenen, XII.1923-V.1924 (Thomasset); 1 ♂, 1 ♀, *idem*, IX.X.1928; 1 ♀, Umbilo, Durban, 5.9.26 (Bevis). *Orange Free State*—1 ♀, Ficksburg, ii.iii.1932 (Mackie); 1 ♂, 23 ♀♀, 10 mi. Petrus Steyn to Reitz, 27.12.1967 (Munting); 3 ♀♀, H. Smith. *Transvaal*—9 ♂♂, 13 ♀♀, Lyttelton, Pretoria, 18 Dec. 1967–29 Feb. 1968, UV light; 1 ♂, 1 ♀, Malelane, 24.III.1952 (Janse and Vari); 6 ♀♀, Hartebeespoort Dam, 20 mi. W Pretoria, 30 October 1967; 1 ♀, Johannesburg, XII.26.1951 (Capener); 1 ♂, 1 ♀, Mariepskop near Klaserie, 6300 ft., 30 Nov. 1967; 1 ♀, Sycamore, 28 Apr. 1926 (Horn); 1 ♀, Claudiusshoop, 11 mi. N Dendron, 17.12.65 (Johannsmeier) (SANC, TM, SAM, BM[NH], HM, USNM, JAS, RTS).

Eminoculus, new genus

MACROPTEROUS MALE: Small, stout bodied; entire body surface highly polished, shining; dorsum rugulose or rugose; vestiture variable.

Head vertical, very broad, eyes stylate; frons convex; head viewed anteriorly V-shaped below eyes; juga bulging; bucculae expanded; gula obsolete; antennae inserted below ventral margin of eyes at about level of dorsal margin of clypeus; antennal segment 1 moderately enlarged, segment 2 tapering slightly proximally, distal diameter nearly equal to diameter of segment 1, segments 3 and 4 about equal to proximal diameter of segment 2; pronotum nearly flat longitudinally, weakly convex transversely, with flattened collar about as wide as diameter of antennal segment 1, lateral margins very slightly concave, posterior margin weakly concave across scutellum; calli well defined, separated medially; mesoscutum broadly exposed, inclined anteriorly; scutellum nearly flat; clavi inclined medially to scutellum, forming low ridge along claval commissure; cells of membrane with evenly rounded posterior margin; legs rather short, posterior femora noticeably bowed; tibiae with scattered thin spines on ventral surface, lacking rows of tiny closely-spaced spines; tarsal claws broad basally; parempodia hair-like, parallel; pulvilli relatively large, attached to most of ventral surface of claws.

MALE GENITALIA: Figures 251–253. Phylini-type; structure of vesica, phallosome, and claspers not showing particularly close relationship to other known genera.

BRACHYPTEROUS FEMALE: See *Eminoculus drosanthemi*.

FEMALE GENITALIA: Figure 254. Posterior wall a simple sclerotized plate; sclerotized rings moderately infolded laterally.

TYPE SPECIES: *Eminoculus drosanthemi*, new species.

This genus is named for its stylate eyes.

Eminoculus is unique among the South African Miridae by virtue of its stylate eyes (which are reminiscent of those of *Pachytomella* Reuter in the Halticini) and peculiar coleopteroid females. The only other described phyline genera with stylate eyes are *Lasiolabops* Poppius and *Lasiolabopella*, in which the eyes are not nearly so conspicuously stalked as in *Eminoculus*. *Eminoculus* is the only known member of the Phylini with a well developed flat pronotal collar. This structure suggests a relationship to the Hallodapini, but other characters, including the form of the male genitalia and the structure of the pulvilli do not support such a relationship.

Eminoculus drosanthemi, new species

Figures 64–65, 251–254

MACROPTEROUS MALE: Basic coloration shining black; antennal segment 1, proximal three-fourths of antennal segment 2, dorsal surface of all femora distally, all tibiae, all tarsal segments 1 and 2, ventral margin of prothoracic pleuron, ventral margin of mesepimeron, and posterior margin of metepisternum cream or light brown; distal quarter of antennal segment 2 and segments 3 and 4 entirely brown; membrane smoky brown.

Coxae generally pruinose; body covered with decumbent, short, light hairs; antennae with short decumbent vestiture, segment 1 with one or two slender, erect spines on interior surface; vertex, pronotum, and genal region dorsad of bucculae with long, erect, fine hairs; abdominal venter with long, reclining hairs; posterior half of pronotum rugulose, contrasting with smooth calli.

Vertex slightly depressed, posterior margin carinate, concave; posterior margin of eyes slightly anterior to transverse midline of pronotum; labium reaching to trochanteral joint of mesocoxae; lateral corial margins weakly convex; cuneal incisure shallow; metatarsal segment 3 slightly longer than segment 2, segment 2 slightly longer than segment 1.

MEASUREMENTS: Total length 2.28, maximum width 1.04, length head .12, width head 1.08, interocular space .56, length pronotum .48, width pronotum 1.00, length scutellum .40, width scutellum .60, length corium 1.14, length clavus .95, length cuneus .39, width cuneus .26, length claval commissure .52, distance apex commissure-apex membrane 1.10, length metatibia 1.30; length antennal segments 1—.30, 2—.70, 3—.38, 4—.28; length labial segments 1—.28, 2, 3, and 4—.54.

MALE GENITALIA: Figures 251–253.

BRACHYPTEROUS FEMALE: Coleopteroid; general coloration, surface texture, and pubescence as in macropterous male.

Head similar in structure to male; vertex not depressed, posterior margin more strongly concave and not as finely carinate as in male; frons more strongly produced than in males; pronotum nearly horizontal longitudinally, posterior margin forming shallow inverted “V”; hemelytra reduced, undifferentiated, coleopteroid, posterior margins forming an inverted “V”, posterolateral angles broadly rounded; apex of abdomen exposed.

MEASUREMENTS: Total length 2.32, maximum width 1.36, width head 1.20, interocular space .66.

FEMALE GENITALIA: Figure 254.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Meintjies Kop, Pretoria, 22 Oct. 1967, J. A. & S. Slater (Adults and nymphs on *Drosanthemum floribundum* [Harv.] Schwart.) (SANC).

PARATYPES: *Transvaal*—3 macropterous ♂♂, 5 brachypterous ♀♀, Pretoria, 6.9.66 (duPlessis); 4 macropterous ♂♂, 14 brachypterous ♀♀, Pretoria, 24 October 1967 (Adults and nymphs on *Drosanthemum floribundum* [Harv.] Schwart.); 1 brachypterous ♀, Pretoria, National Botanical Gardens, 28 Dec. 1967 (SANC, JAS, RTS).

This species is named for the host, *Drosanthemum floribundum* (Harv.) Schwart. (Aizoaceae).

Eminoculus drosanthemi can be separated from all other members of the Phylinae by its conspicuously stylate eyes, shining black rugulose dorsum with inconspicuous pubescence, and very small size. *E. hirsutus* is similar to *drosanthemi* in the structure of the head, but can be separated from it by the very wide pronotal collar, pronounced calli, and long erect pubescence.

This species was found on its mat-like host by lifting up a section of the plant and examining closely the lower stems.

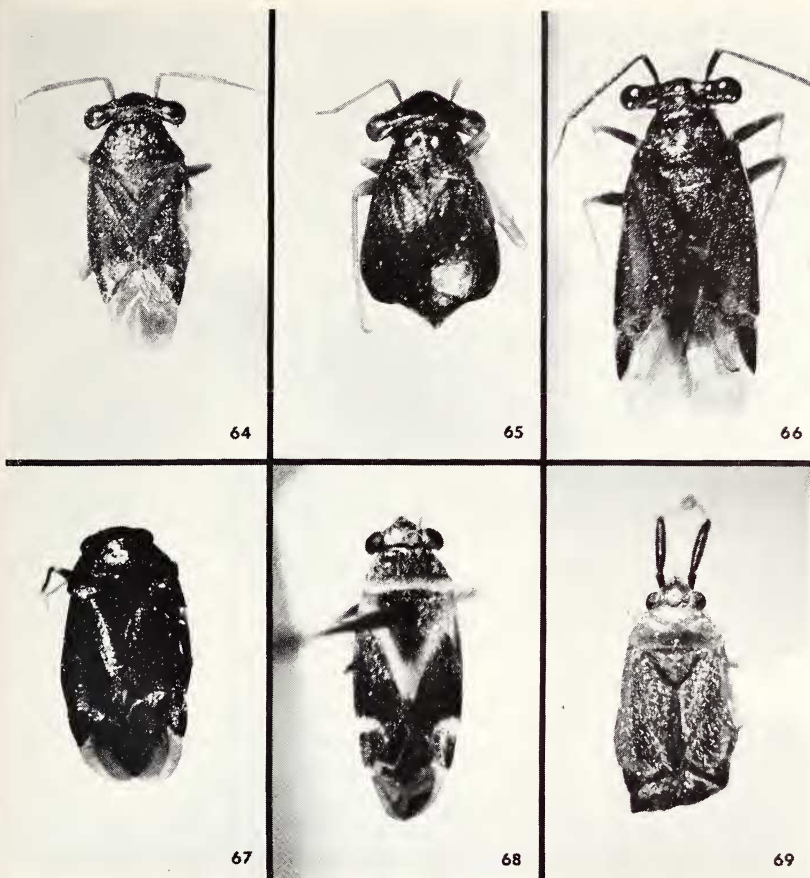
Three additional brachypterous female specimens from the Cape Province bear the following data: Calvinia, XI.1931 (deposited in British Museum [Natural History]; Moordenaars Karoo, Lammerfontein, Oct. 1952 (deposited in South African Museum); and, Knysna Head, 1 Feb. 1968 (deposited in J. A. Slater Collection). These specimens differ in the structure of the head, surface texture of the pronotum, and type of pubescence from the Pretoria specimens, and are therefore not included in the paratype series.

***Eminoculus hirsutus*, new species**

Figure 66

MACROPTEROUS MALE: Head, pronotum, and scutellum shining black; corium, clavus, cuneus, antennae, entire venter, labium, femora (except tibial joint), and all tarsal segments 3 dull black; ventral margin of mesepimeron and metepimeron, all femora distally, all tibiae, and tarsal segments 1 and 2 tan or light brown; membrane dark smoky brown; all coxae mostly pruinose.

Head, pronotum, and scutellum rugulose; hemelytra faintly rugulose; remainder of body dull, finely granulose; frons, vertex, head below eyes and above bucculae, pronotum, scutellum, and basal region of hemelytra with long, sericeous, erect or semierect hairs;



FIGS. 64-69. Phylini. Fig. 64. *Eminoculus drosanthemi*, male, holotype. Fig. 65. *Eminoculus drosanthemi*, female (Pretoria, Transvaal). Fig. 66. *Eminoculus hirsutus*, male, holotype. Fig. 67. *Lamprosthenarus* near *sjostedti*, male (Bridal Veil Falls, Sabie, Transvaal). Fig. 68. *Lasiolabopella capeneri*, female (Tzaneen, Transvaal). Fig. 69. *Lepidocapsus rubrum*, male, holotype.

hemelytra with numerous, venter of thorax and abdomen with less numerous, decumbent, light hairs; antennae with dense decumbent vestiture, segment 1 with several fine black spines on interior surface; femora with a few, long, erect hairs, particularly on the ventral surfaces.

Head short, transverse, eyes on long stalks projecting laterally

beyond anterolateral margins of pronotum by distance on each side about equal to three-fourths width of the anterior margin of the pronotum; eyes nearly spherical; posterior margin of vertex forming fine, rounded carina medially, grading into cylindrical eye stalks laterally; vertex depressed on either side of midline anterior to posterior margin; labium just surpassing procoxae; pronotum with anterior margin nearly straight, lateral and posterior margins sinuate; pronotum with very deep, wide, transverse impression medially; calli elevated, pronounced, largely confluent; cuneal incisure shallow, fracture angled anteromedially; tibiae with semierect, black spines; metatarsal segment 1 about one-third length of segment 2, segment 3 about two-thirds length of segment 2; metafemora weakly bowed.

MEASUREMENTS: Total length 3.72, maximum width 1.36, length head .16, width head 1.32, interocular space .74, length pronotum .62, width pronotum 1.20, length scutellum .56, width scutellum .68, length corium 1.64, length clavus 1.18, length cuneus .68, width cuneus .34, length claval commissure .68, distance apex commissure-apex membrane 1.54, length metatibia 1.94; length antennal segments 1—.50, 2—1.06, 3—.52, 4—?; length labial segments 1—.30, 2—.26, 3—.12, 4—.12.

MALE GENITALIA: Not examined.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Oudtshoorn, Zebra, Mus. Expd., Oct. 1951 (SAM).

This species is named for its conspicuous long vestiture.

See discussion under *E. drosanthemi*.

Lamprosthenarus Poppius

Lamprosthenarus Poppius, 1914a, p. 91.

Lamprosthenarus can be separated from other African genera of Phylinae by the following combination of characters: parempodia hair-like and parallel; head extremely short and concave behind, posterior margin of vertex finely carinate; dorsum heavily punctured; and, entire body shining black and metallic. *Agrametra* Buchanan-White and *Neoambonea* have a similar combination of characters, but the former is endemic to St. Helena, and the latter has fleshy, apically convergent, recurved parempodia and belongs to the Pilo-phorini.

MALE GENITALIA: Figures 255–257. Vesica structurally very similar to *Coatonocapsus*, with two attenuated apical spines.

Lamprosthenarus near *sjostedti* Poppius

Figures 67, 255–257

Comparison of specimens of *Lamprosthenarus* from South Africa with the type female of *L. sjostedti* from Mt. Kilimanjaro, deposited in the Stockholm Museum, reveals that they are very similar, appearing to differ only in size. *Lamprosthenarus* near *sjostedti* can be recognized in South Africa by the characters given above for the genus.

MEASUREMENTS: Macropterous ♂—Total length 2.76, maximum width 1.40.

MALE GENITALIA: Figures 255–257.

Specimens of *sjostedti* from Bridal Veil Falls, near Sabie, were swept from a field containing sedges, grasses, and many ruderal plant species.

SPECIMENS EXAMINED: *Natal*—1 macropterous ♀, Giants Castle Park, 5800 ft., 6 Mar. 1968. *Transvaal*—2 macropterous ♂♂, Bridal Veil Falls, Sabie, 29 Nov. 1967 (RTS).

***Lasiolabopella*, new genus**

MACROPTEROUS FEMALE: Dorsum smooth, dull; body covered with black and sericeous, scale-like, appressed hairs; antennae and legs with very fine, short, decumbent, inconspicuous hairs.

Small, body flattened; eyes substylate, strongly protuberant, weakly granular; head nearly as broad as posterior margin of pronotum; posterior margin of vertex (including eyes) concave, reaching posteriorly around anterior angles of pronotum; frons triangular from above, strongly produced anteriorly, attaining distal end of antennal segment 1; eyes reaching almost to gula, leaving small genal area exposed; antennae inserted slightly above ventral margin of eyes, fossae contiguous with sinuate anterior margins of eyes; antennal segment 1 slightly enlarged, with single fine spine on dorsal surface, segment 2 gradually enlarged distally to about 1½ times proximal diameter, distally about same diameter as segment 1, segments 3 and 4 about equal to proximal diameter of segment 2; gula short, about as long as diameter of antennal segment 1; anterior margin of pronotum finely carinate, upturned; calli distinctly raised, flattened, confluent medially; pronotum nearly horizontal; mesoscutum narrowly exposed, scutellum and mesoscutum flat; lateral corial margins weakly convex; cuneal fracture angled anteromedially; membrane with two cells; legs short; all tibiae with rows of tiny, closely-spaced spines, without longer spines; tarsal claws relatively

short, rather strongly and smoothly curved, broad basally; parempodia hair-like, parallel; pulvilli minute.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

MACROPTEROUS MALE: Very similar to female.

MALE GENITALIA: Figures 258–260. Typical of Phylini, showing no particularly close relationship to other known genera.

TYPE SPECIES: *Lasiolabopella capeneri*, new species.

This genus is named for its resemblance to *Lasiolabops* Poppius.

Lasiolabopella can be recognized by its very small size, flattened body, substylate eyes, and covering of black and sericeous scale-like hairs. *Eminoculus*, the only genus in South Africa with a similar head structure, is shining black and lacks scale-like hairs. *Lasiolabops*, from East and West Africa, differs from *Lasiolabopella* by being much larger, not having a flattened body, and having a much shorter head.

***Lasiolabopella capeneri*, new species**

Figures 68, 258–260

MACROPTEROUS FEMALE: Head, anterior three-fourths of pronotum, scutellum, clavus adjacent to scutellum, corium (except as noted below), cuneus, membrane except veins, mesothoracic and metathoracic pleura and sterna (except ostiolar peritreme), abdomen, all coxae, all femora (apices sometimes light), and labium dark brown; posterior fourth of pronotum, most of clavus, extreme base and apex of corium, veins of membrane, and prosternum white; antennae, tibiae, tarsi (and sometimes femora distally), and ostiolar peritreme very light yellow white.

Scutellum and anterior two-thirds of clavus densely covered with appressed, scale-like, sericeous hairs; posterior third of pronotum, anterior two-thirds of corium, and clavus with a few black, scale-like hairs; posterior third of cuneus densely covered with black, scale-like hairs; abdominal venter thickly covered with generally black-appearing scale-like hairs; eyes with very short hairs.

Posterior margin of vertex with low rounded carina medially; labium just attaining trochanteral joint of mesocoxae; pronotum with anterior margins sinuate, lateral margins straight, posterior margin shallowly excavated; cuneal incisure shallow; abdomen almost attaining apex of cuneus; metatarsal segment 1 about one-half length of segment 2, segments 2 and 3 subequal in length.

MEASUREMENTS: Total length 3.20, maximum width 1.20, length head .44, width head .88, interocular space .44, length pronotum .44, width pronotum 1.00, length scutellum .40, width scu-

tellum .60, length corium 1.60, length clavus 1.16, length cuneus .52, width cuneus .36, length claval commissure .62, distance apex commissure-apex membrane 1.20, length metatibia 1.36; length antennal segments 1—.18, 2—.78, 3—.58, 4—.24; length labial segments 1—.32, 2—.36, 3—.36, 4—.30.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

MACROPTEROUS MALE: Very similar to female.

MALE GENITALIA: Figures 258–260.

HOLOTYPE: Macropterous ♀, SOUTH AFRICA: *Transvaal*, Tzaneen, 11–16 Dec. 1963, A. L. Capener (Host plant *Terminalia sericea*) (SANC).

PARATYPES: *Transvaal*—1 macropterous ♀, 10 mi. N. Acornhoek, 29 Nov. 1967, at light; 1 macropterous ♂, 5 macropterous ♀♀, Middelfontein nr. Nylstroom, XII-17-1953 (Capener); 4 macropterous ♀♀, same data as holotype; 1 macropterous ♀, 6 mi. N. Warmbaths, 7 Dec. 1967 (SANC, JAS, RTS).

ADDITIONAL SPECIMENS: SOUTH WEST AFRICA—1 macropterous ♂, 1 macropterous ♀, Abachaus, XI.1949 (Hobohm) (TM).

This species is named for Mr. A. L. Capener.

See generic discussion.

The specimens from Abachaus, South West Africa, have the male genitalia identical with those from the *Transvaal*, but are lighter in color and have therefore not been included in the paratype series.

The only known host record for *capeneri* is *Terminalia sericea* Burch. (Combretaceae).

Lepidocapsus Poppius

Lepidocapsus Poppius, 1914a, pp. 103–104.

Lepidocapsus can be recognized by the following combination of characters: the parempodia are hair-like and parallel; the pulvilli are large and fused to the entire ventral surface of the claws; antennal segment 2 is very thick, fusiform, and about $2\frac{1}{2}$ times diameter of segments 3 and 4; and, the dorsum is densely covered with reclining, heavy, setiform hairs and decumbent wooly sericeous hairs. No other phylina from South Africa has the greatly enlarged second antennal segment. *Rakula* Odhiambo and *Atractotomus* Fieber from tropical Africa have an enlarged second antennal segment but both lack the wooly sericeous hairs on the dorsum.

MALE GENITALIA: Figures 261–263. Vesica with two attenuated spines apically, possibly showing a relationship to *Coatonocapsus*.

Poppius (1914a) noted that the holotype of *Lepidocapsus cras-sicornis* Poppius was deposited in the Berlin-Humboldt Museum. In fact it is in the Helsinki Museum (Type No. 12257).

Lepidocapsus presently includes two species from Malawi and South Africa.

***Lepidocapsus rubrum*, new species**

Figures 69, 261–263

MACROPTEROUS FEMALE: Small, robust, basic coloration bright red; antennal segments 1 and 2 and all tarsal segments 3 black; antennal segments 3 and 4, all tibiae, and all tarsal segments 1 and 2 yellow; membrane light smoky gray, veins of small cell red, veins of large cell unicolorous with membrane; venter including coxae slightly darker than dorsum.

Entire body smooth, weakly shining; dorsum with dense, semi-erect, long, light colored hairs (about as long as tibial diameter), and decumbent, sericeous, wooly hairs; thoracic pleura with wooly hairs; abdominal venter with reclining fine golden hairs; antennal segments 1 and 2 with dense, reclining, short, black vestiture, segments 3 and 4 with semierect, light colored hairs about as long as diameter of segment 3; femora with fine reclining light colored hairs; gular region below eyes with several very long, light colored hairs; eyes with short hairs visible at about $25\times$.

Head deflexed; eyes rather small as viewed from above, contiguous with anterior margin of pronotum; vertex convex, posterior margin ecarinate; antennae inserted slightly above ventral margin of eyes; antennal segment 1 somewhat conical in shape, largest distally, segment 2 greatly enlarged, fusiform, about $1\frac{1}{2}$ times diameter of segment 1, segments 3 and 4 about one-third diameter of segment 2; labium just reaching trochanteral joint of metacoxae; pronotum with anterior, lateral, and posterior margins nearly straight; cuneal incisure shallow; tibiae with a few semierect dark spines, about length of tibial diameter, with dark bases; only metatibiae with rows of tiny, closely-spaced, dark spines; metatarsal segments 1 and 2 subequal in length, segment 3 slightly longer than segment 2.

MEASUREMENTS: Total length approximately 2.65, maximum width 1.24, length head .22, width head .64, interocular space .36, length pronotum .40, width pronotum 1.04, length scutellum .44, width scutellum .60, length corium 1.36, length clavus 1.12, length cuneus .40, width cuneus .44, length claval commissure .56, distance apex commissure-apex membrane approximately .96, length meta-

tibia 1.30; length antennal segments 1—.16, 2—.64, 3—.34, 4—.22; length labial segments 1—.28, 2—.28, 3—.24, 4—.28.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

MACROPTEROUS MALE: Very similar to female except eyes slightly larger and vertex relatively narrower.

MALE GENITALIA: Figures 261–263.

HOLOTYPE: Macropterous ♀, SOUTH AFRICA: *Cape Province*, Ceres, 25 Jan. 1968, J. A. & S. Slater, T. Schuh, M. Sweet, UV light (SANC).

PARATYPES: *Cape Province*—7 macropterous ♂♂, 10 macropterous ♀♀, Michell's Pass Summit SW of Ceres, 25 Jan. 1968 (Adults and nymphs on *Erica exurgens* Andr.) (SANC, HM, JAS, RTS).

This species is named for its bright red coloration.

Lepidocapsus rubrum differs from *L. crassicornis* by being smaller and bright red; *crassicornis* is dull orange.

The host of this species, *Erica exurgens* Andr. (Ericaceae), has bright red flowers very similar to the color of *rubrum*.

An additional specimen of *Lepidocapsus*, possibly representing a new species, is known from Blouberg, Motlakeng, 5–6000 ft., Transvaal (deposited in the Transvaal Museum). It is slightly larger than *rubrum* and is dull red.

Leptoxanthus Reuter

Leptoxanthus Reuter, 1905d, p. 8.

Leptoxanthus includes only a single species from South West Africa. The genus was related to *Tuponia* by Reuter (1905d); Poppius (1914a) keyed out *Leptoxanthus* with *Brachycranella* in the last couplet of his key to the Phylinae, considering both genera to lack "arolia" (see also discussion under *L. flaveolus*).

Leptoxanthus flaveolus Reuter

Leptoxanthus flaveolus Reuter, 1905d, p. 8.

Leptoxanthus flaveolus was described by Reuter (1905d) from a female collected by Wahlberg at "Svakop." This locality is almost certainly the Svakop River in South West Africa, which is at about 22–23° S. latitude. I have not been able to locate the holotype of *flaveolus* in the Helsinki Museum (personal communication, Martin Meinander, Helsinki Museum). Until this specimen can be found the exact identity and relationships of *Leptoxanthus* cannot be determined.

Macrotylus Fieber

Macrotylus Fieber, 1858, p. 325.

Macrotylus can be recognized in South Africa by the strongly anteriorly projecting clypeus, the long, free pulvilli, and the absence of heavy setiform hairs on the dorsum. *Denticulophallus* is the only other genus from the region with pulvilli that are nearly as long as the claw and free from it over most of their length. The size and coloration of *Macrotylus* are quite variable.

Macrotylus is widely distributed in the Nearctic and Palearctic, but has not been previously recorded from the Ethiopian Region.

Ten male specimens from Claudiusshoop, 11 mi. N. Dendron, Transvaal, deposited in the South African National Collection of Insects, probably represent a new genus allied to *Macrotylus*. They have the pretarsal structures very similar to *Macrotylus*, but the head is more strongly declivent. All are in very poor condition and therefore cannot be described at this time.

Macrotylus hemizygiae, new species

Figures 266-268

MACROPTEROUS MALE: Basic coloration very light yellow green or yellow brown; head, anterior half of pronotum, and midline of scutellum tinged with greenish; scutellum mostly light brown; femora (particularly metafemora) covered with small, round, brown spots at bases of hairs.

Entire body smooth, dull; pronotum sparsely, scutellum, clavus, corium, and cuneus rather densely, covered with moderately long, fine, decumbent, black hairs; entire dorsum and thoracic pleura densely covered with decumbent, wooly, sericeous hairs; antennae with short, reclining, dark vestiture; antennal segment 1 with several erect, slender, black spines; eyes with very short hairs; abdominal venter with moderately long, reclining, light hairs; all femora with decumbent dark hairs, ventral margins with a few, erect, long, fine, light hairs; tibiae with semierect, dark spines about as long as tibial diameter.

Head strongly produced anteriorly; juga and clypeus prominent; vertex and frons convex; eyes granular, protuberant, appearing nearly hemispherical as viewed from above, occupying nearly entire sides of head posterior to antennal bases; segment 1 moderately enlarged, segment 2 nearly cylindrical, slightly greater in diameter distally than proximally, about one-half diameter of segment 1, segments 3 and 4 of slightly smaller diameter than segment 2; lora forming a low angle with longitudinal axis of body; bucculae slightly ex-

panded; gula horizontal, about as long as width of eye viewed from side; labium just surpassing metacoxae; posterior margin of pronotum weakly sinuate, calli indistinct; pronotum slightly inclined posteriorly; mesoscutum and scutellum nearly flat; hemelytra weakly convex laterally; cuneal incisure obsolete; cuneal fracture slightly angled anteromedially; membrane with two cells, metatibiae with longitudinal rows of tiny, closely spaced spines; metatarsal segment 1 about one-half length of segment 3, segment 3 about two-thirds length of segment 2; pretarsal structures as described under *M. niger*.

MEASUREMENTS: Total length approx. 3.92, maximum width 1.48, length head .40, width head .68, width vertex .36, length pronotum .52, width pronotum 1.16, length scutellum .48, width scutellum .68, length corium 1.88, length clavus 1.36, length cuneus .64, width cuneus .40, length claval commissure .84, distance apex commissure-apex membrane approx. 1.65, length metatibia 2.20; length antennal segments 1—.26, 2—1.26, 3—.88, 4—.42; length labial segments 1—.44, 2—.42, 3—.30, 4—.42.

MALE GENITALIA: Figures 266–268.

MACROPTEROUS FEMALE: Very similar to male.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Kruger Nat. Park, Oliphants River near Oliphants Camp, 30 Apr. 1968, T. Schuh, J. A. & S. Slater, M. Sweet (Adults and nymphs on *Hemizygia thornicrofti* [N.E. Br.] Ashby) (SANC).

PARATYPES: *Transvaal*—7 macropterous ♂♂, 13 macropterous ♀♀, same data as holotype (SANC, JAS, RTS).

ADDITIONAL SPECIMENS: *Transvaal*—1 macropterous ♂, 1 macropterous ♀, 2 nymphs (in alcohol), same data as holotype; 2 macropterous ♂♂, 1 macropterous ♀, 4 nymphs (in alcohol), Kruger Nat. Park, Letaba River near Oliphants Camp, 30 Apr. 1968 (RTS).

This species is named for the host genus, *Hemizygia*.

Macrotylus hemizygiae can be separated from *M. niger*, the only other species of *Macrotylus* occurring in South Africa, by its light coloration and decumbent wooly pubescence.

The host, *Hemizygia thornicrofti* (N.E. Br.) Ashby (Labiatae), was growing on a rocky slope on the banks of the Letaba River.

***Macrotylus niger*, new species**

Figures 70, 264, 265

MACROPTEROUS MALE: Basic coloration black; membrane smoky brown, dark; veins of membrane, and mesial margin of cuneus narrowly, white.

Dorsum smooth, dull or very weakly shining, with reclining, moderately long, light hairs; eyes with short hairs; antennae with decumbent, short, dense, light hairs; thoracic pleura with a few hairs as on dorsum; abdominal venter with reclining, weakly shining hairs; femora with inconspicuous decumbent hairs; tibiae and tarsi with reclining dark hairs and tibiae with scattered, semierect, black spines about as long as tibial diameter.

Head only slightly declivous, clypeus prominent; vertex and frons convex; eyes small as viewed from above, protuberant, occupying nearly entire sides of head behind antennal bases; antennae inserted just below middle of anterior margins of eyes, fossae contiguous with eyes; antennal segment 1 moderately enlarged, segment 2 nearly cylindrical, about three-fourths diameter of segment 2; bucculae slightly expanded; gula short, length about equal to diameter of antennal segment 2; labium slightly surpassing metacoxae; posterior margin of pronotum nearly straight; hemelytra nearly parallel sided; cuneal incisure shallow; membrane with two cells; abdomen almost attaining apex of corium; metafemora flattened, moderately enlarged; all tibiae with rows of tiny, closely spaced spines; metatarsal segment 1 about one-half length of segment 2, segments 2 and 3 subequal in length; tarsal claws strongly curved, very strongly broadened basally; parempodia hair-like, parallel; pulvilli greatly enlarged, fleshy, flattened, free, reaching almost to apex of claw.

MEASUREMENTS: Total length 2.80, maximum width 1.08, length head .22, width head .52, interocular space .26, length pronotum .40, width pronotum .94, length scutellum .40, width scutellum .60, length corium 1.38, length clavus 1.04, length cuneus .46, width cuneus .22, length claval commissure .56, distance apex commissure-apex membrane 1.26, length metatibia 1.56; length antennal segments 1—.18, 2—.74, 3—.58, 4—.24; length labial segments 1—.30, 2—.32, 3—.26, 4—.24.

MALE GENITALIA: Figures 264, 265.

MACROPTEROUS FEMALE: Very similar to male.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Natal*, Olivier-shoek Pass Summit, 5400 ft. elevation, 25 mi. S. Harrismith, 4 Mar. 1968, T. Schuh, J. A. & S. Slater, M. Sweet, (SANC).

PARATYPES: *Natal*—2 macropterous ♂♂, 2 macropterous ♀♀, V. Reenen. *Transvaal*—1 macropterous ♂, Moketsi, 31.1.63 (Paliatseas); 2 macropterous ♀♀, Mac Mac, Graskop, 17.1.63 (Paliatseas); 1 macropterous ♂, New Chum Falls, nr. Vaalhoek, 17 Jan. 1963 (Capener) (SANC, BM[NH], RTS).

This species is named for its black coloration.

Macrotylus niger can be distinguished from other South African Phylinae by virtue of its very long pulvilli, small size, protuberant clypeus, and black coloration.

Natalophylus, new genus

MACROPTEROUS MALE: Moderately large, elongate, with long appendages; facies *Phylus*-like; body generally smooth, shining; head, pronotum, scutellum, clavus, corium, and cuneus with erect, golden hairs about twice as long as tibial diameter; antennal segment 1 with some decumbent hairs and a thin, erect, dark spine on dorsal surface, segments 2, 3, and 4 with some semierect fine hairs about as long as diameter of segment on which they occur; thoracic pleura glabrous; abdominal venter with fine decumbent hairs; femora with inconspicuous decumbent hairs; tibiae and tarsi with reclining light hairs; all femora with a few, very fine, long, erect hairs on ventral surfaces; metafemora with some long, fine, erect or semierect, spine-like hairs on dorsal surfaces.

Head deflexed; eyes moderately large, protuberant, confluent with anterior pronotal margin, broadly emarginate anteriorly, reaching ventrally almost to gula; antennae inserted slightly above ventral margin of eyes, fossae contiguous with eyes; antennal segment 1 moderately enlarged, segment 2 cylindrical, about two-thirds diameter of segment 1, segments 3 and 4 subequal in diameter, slightly more than one-half diameter of segment 2; clypeus prominent as viewed laterally, not visible from above; bucculae narrow; gula short; labium just surpassing procoxae; pronotum broad, not strongly narrowed anteriorly, anterior margin finely carinate, upturned; pronotum flattened longitudinally, only slightly inclined posteriorly; mesoscutum separated from scutellum by shallow transverse impression; hemelytra nearly straight and parallel sided; cuneal incisure shallow; membrane with two cells; tibiae with scattered, semierect, dark spines about $1\frac{1}{2}$ times length of tibial diameter; only metatibiae with longitudinal row of tiny, closely spaced spines; tarsal claws moderately long, broad basally, evenly curved; parempodia slightly over one-half length of claws, weakly fleshy, convergent apically; pulvilli minute.

MALE GENITALIA: Figures 269–272. Structure of vesica and phallosheca of phylene pattern, but showing no relationship to other known genera.

MACROPTEROUS FEMALE: Eyes slightly smaller and vertex relatively wider than in male.

FEMALE GENITALIA: Not examined.

TYPE SPECIES: *Natalophylus heteromorphae*, new species.

This genus is named for its occurrence in Natal and its great similarity in appearance to *Phylus* Hahn from Europe.

Natalophylus resembles *Phylus* very closely superficially but differs in the following characters: the head is much more strongly deflexed; the gula is much shorter; the labium is much shorter, only slightly surpassing the procoxae; and, the tibial spines are dark with dark bases. Also the vesica and phallosome of *Natalophylus* are structurally very dissimilar to those of *Phylus* (see Wagner and Weber, 1964).

Natalophylus can be recognized by its very long antennae, long, light colored legs, short labium, single type of dorsal pubescence, and weakly fleshy, apically convergent parempodia.

***Natalophylus heteromorphae*, new species**

Figures 71, 269–272

MACROPTEROUS MALE: Brownish black, including antennae; labium and legs, including coxae, bright yellow; base of labium, metacoxae proximally, small round spots on femora, bases of tibial spines, and all tarsal segments 3 brownish black.

Eyes with very short hairs.

Vertex nearly flat, posterior margin straight, very weakly carinate; pronotum with anterior margin weakly sinuate, lateral margins nearly straight, posterior margin broadly excavated, scutellum weakly convex; cuneal fracture slightly angled anteromedially; abdomen not quite attaining apex of cuneus; metatarsal segment 1 about one-half length of segment 2, segment 2 slightly longer than segment 3.

MEASUREMENTS: Total length 4.16, maximum width 1.68, length head .24, width head .80, interocular space .40, length pronotum .48, width pronotum 1.16, length scutellum .76, width scutellum .84, length corium 2.12, length clavus 1.68, length cuneus .68, width cuneus .28, length claval commissure .88, distance apex commissure-apex membrane 1.76, length metatibia 2.56; length antennal segments 1—.36, 2—1.84, 3—1.00, 4—.80; length labial segments 1—.26, 2—.26, 3—.14, 4—.20.

MALE GENITALIA: Figures 269–272.

MACROPTEROUS FEMALE: Eyes slightly smaller and vertex relatively wider than in male.

FEMALE GENITALIA: Not examined.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: Natal, Olivier-shoek Pass Summit, 5400 ft. elevation, 25 mi. S. Harrismith, 4 Mar.

1968, T. Schuh, J. A. & S. Slater, M. Sweet (Adults and nymphs on *Heteromorpha trifoliata* [Wendl.] Eckl. & Zeyh.) (SANC).

PARATYPES: 3 macropterous ♂♂, 8 macropterous ♀♀, same data as holotype (SANC, JAS, RTS).

This species is named for the host genus, *Heteromorpha*.

See generic discussion for separation from other members of the Phylinae.

This species is known only from the type locality on *Heteromorpha trifoliata* (Wendl.) Eckl. & Zeyh. (Umbelliferae). The host genus is African, containing six species, three of which occur in South Africa (Phillips, 1951).

Odhiamboella, new genus

MACROPTEROUS MALE: Elongate; body dull or weakly shining, generally with reclining, golden, setiform hairs; antennal segment 1 with one or two slender, erect spines, segments 2, 3, and 4 with short, dense, reclining vestiture; tibiae with semierect black spines; genae with long erect hairs; eyes with very short hairs.

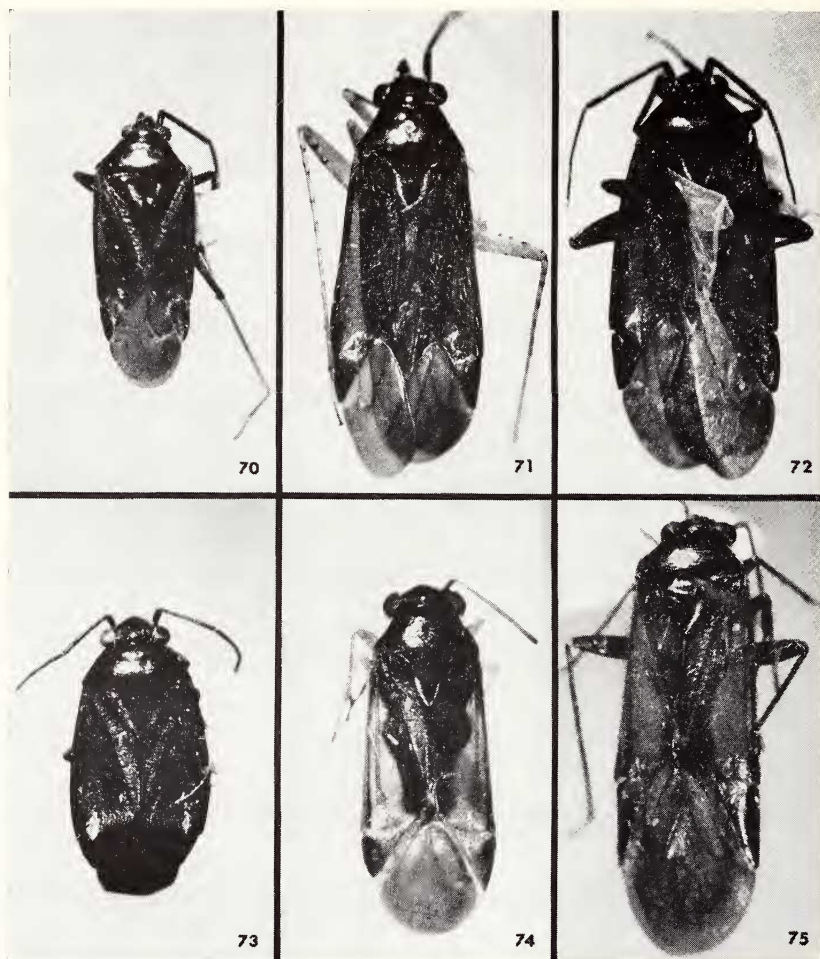
Head deflexed, clypeus just visible from above; eyes confluent with anterolateral angles of pronotum; vertex convex, posterior margin ecarinate; frons convex; antennae inserted just above ventral margins of eyes, fossae contiguous with eyes; antennal segment 1 slightly enlarged, segment 2 increasing slightly in diameter distally to about diameter of segment 1, segments 3 and 4 subequal to proximal diameter of segment 2; labium reaching at least to metacoxae; pronotum with anterior margin finely carinate, upturned, lateral margins weakly convergent anteriorly, calli indistinct; mesoscutum inclined anteriorly, scutellum weakly convex; lateral corial margins nearly straight, cuneal fracture sinuate; membrane with two cells; all tibiae with rows of tiny, closely spaced spines; tarsal claws moderately long, strongly curved, broad basally; parempodia hair-like, parallel; pulvilli minute.

MALE GENITALIA: Figures 273–275. Similar in structure to *Capecapsus* and *Coatonocapsus*, vesica forming single coil.

MACROPTEROUS FEMALE: Very similar to male, eyes slightly smaller, vertex relatively wider.

TYPE SPECIES: *Pseudosthenarus solani* Odhiambo.

Odhiamboella is being erected to receive a single species, *solani*, from East and South Africa. Originally described in *Pseudosthenarus*, *solani* must be placed in a new genus based on its possession of only a single type of pubescence on the dorsum and the vesica



FIGS. 70-75. Phylini. Fig. 70. *Macrotylus niger*, male, holotype. Fig. 71. *Natalophylus heteromorphae*, male, holotype. Fig. 72. *Parapseudosthenarus buchenroederiae*, male (Giants Castle, Natal). Fig. 73. *Parapseudosthenarus buchenroederiae*, female (Sani Pass, 6200 ft., Natal). Fig. 74. *Parasciodema albicoxa*, male, holotype. Fig. 75. *Parasciodema nigrifemur*, male, holotype.

of the male forming a single complete coil. These characters, as well as the general facies, relate *Odhiamboella* to *Coatonocapsus* and *Capecapsus* (see also discussion under *Pseudosthenarus* and *Sthenarus nigricornis*).

Odhiamboella solani (Odhiambo)

Figures 273–275

Pseudosthenarus solani Odhiambo, 1958a, pp. 241–246.

Odhiamboella solani can be separated from all other South African Phylinae by the following combination of characters: dorsum with only setiform hairs; basic coloration black, clavus and cuneus mostly yellowish; and, vesica forming a coil, apically with a single long spine.

Odhiambo (1958a) described the variation in this species from East Africa. His analysis applies in South Africa.

No host information is available for South Africa, but *solani* feeds on *Solanum* sp. in East Africa (Odhiambo, 1958a).

SPECIMENS EXAMINED: All specimens macropterous. *Transvaal*—15 ♂♂, 4 ♀♀, Argent, XII-7-10-1953 (Capener); 1 ♂, 1 ♀, Irene, Pretoria, I-23-1952 (Capener); 2 ♂♂, Letaba Valley, Tzaneen Dist., XII-10-31-1958 (Capener); 1 ♀, Rustenburg, II-22-1953 (Capener); 1 ♂, Wonderboom, 12.3.15 (Swierstra) (SANC, TM, JAS, RTS).

Parapseudosthenarus, new genus

MACROPTEROUS MALE: Elongate, nearly parallel sided; entire body smooth, dull or weakly shining; dorsum with reclining setiform hairs; dorsum, thoracic pleura, and abdominal venter with decumbent wooly, sericeous hairs; antennal segment 1 with slender black spine, segments 2, 3, and 4 with short dense decumbent vestiture and semierect hairs about as long as diameter of segment 2; head below eyes with a few, long, erect hairs; abdominal venter with reclining hairs; femora with decumbent hairs and a few, very long, erect hairs on ventral surfaces; tibiae with black spines about as long as tibial diameter.

Head declivous; vertex nearly flat, posterior margin with low, rounded carina; frons convex; eyes moderately large, protuberant, reaching almost to gula, anterior margins sinuate; antennae inserted just above ventral margins of eyes, fossae contiguous with eyes; segment 1 moderately enlarged, segment 2 of slightly smaller diameter than segment 1, segments 3 and 4 about two-thirds diameter of segment 2; bucculae narrow; gula short; pronotum with anterior margin finely carinate, upturned, lateral margins nearly straight, slightly convergent anteriorly, disc only slightly inclined posteriorly; meso-scutum separated from weakly convex scutellum by a transverse impression; cuneal incisure shallow; membrane with two cells; legs moderately long; metafemora somewhat enlarged; tarsal claws long,

gently curved, broad basally; parempodia hair-like, parallel; pulvilli minute.

MALE GENITALIA: Figures 289–292. Similar in structure to *Pseudosthenarus*; very small in relation to total body size; vesica U-shaped; right clasper lanceolate.

BRACHYPTEROUS FEMALE: See *P. buchenroederæ*.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

TYPE SPECIES: *Parapseudosthenarus buchenroederæ*, new species.

This genus is named for its resemblance to *Pseudosthenarus* Poppius.

Parapseudosthenarus can be recognized by its entirely black coloration, including all appendages, wooly and setiform hairs, and the structure of the male genitalia. The most closely related genus, *Pseudosthenarus*, always has at least part of the legs or antennae yellow or dull white. The male genitalia of *Parapseudosthenarus* appear in structure to be possible precursors of the type found in *Pseudosthenarus*.

***Parapseudosthenarus buchenroederæ*, new species**

Figures 72, 73, 289–292

MACROPTEROUS MALE: Entirely dull black, membrane smoky dark brown.

Eyes with short hairs.

Labium just surpassing apex of procoxae; pronotum with indistinct confluent calli, posterior margin nearly straight; cuneal fracture very slightly angled anteromedially; abdomen reaching to about middle of cuneus; metatarsal segment 1 about one-third length of segment 2, segments 2 and 3 subequal in length.

MEASUREMENTS: Total length 4.56, maximum width 1.76, length head .24, width head .80, interocular space .36, length pronotum .60, width pronotum 1.32, length scutellum .64, width scutellum .80, length corium 2.20, length clavus 1.76, length cuneus .84, width cuneus .48, length claval commissure .96, distance apex commissure-apex membrane 2.35, length metatibia 2.12; length antennal segments 1—.22, 2—1.08, 3—.80, 4—.44; length labial segments 1—.26, 2—.26, 3—.12, 4—.18.

MALE GENITALIA: Figures 289–292.

BRACHYPTEROUS FEMALE: Body surface, vestiture, and coloration as in macropterous male.

Eyes smaller, vertex relatively wider than in male; scutellum nearly flat; hemelytra reduced, just surpassing apex of abdomen; lateral corial margins broadly rounded; metafemora greatly enlarged.

MEASUREMENTS: Total length 3.00, maximum width 1.48, width head .76, interocular space .40.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: Natal, Giants Castle Park, 5800 ft. elevation, 6 Mar. 1968, T. Schuh, J. A. & S. Slater, M. Sweet (Adults and nymphs on *Buchenroedera lotononoides* Scott-Elliot) (SANC).

PARATYPES: Natal—3 macropterous ♂♂, same data as holotype; 3 macropterous ♂♂, 9 brachypterous ♀♀, Sani Pass, 6200 ft., 10 Mar. 1968 (Adults and nymphs on *Buchenroedera lotononoides* Scott-Elliot); 1 brachypterous ♀, Natal National Park, iii.1932 (Mackie) (SANC, BM[NH], JAS, RTS).

ADDITIONAL SPECIMENS: 1 macropterous ♂, 1 brachypterous ♀, 24 nymphs (in alcohol), same data as holotype; 1 macropterous ♂, 1 brachypterous ♀, 14 nymphs (in alcohol), Sani Pass, 6200 ft., 10 Mar. 1968 (RTS).

This species is named for the host genus, *Buchenroedera*.

See generic discussion for separation from other members of the Phylinae. Although *Parapseudosthenarus buchenroederae* closely resembles some species of *Pseudosthenarus*, the sexual wing dimorphism is much more pronounced in the former than in the latter.

This species is known only from midelevations (ca. 1875 meters [6000 feet]) on the Drakensberg on *Buchenroedera lotononoides* Scott-Elliot (Leguminosae). The host genus is African, with 22 of the 23 species restricted to Natal and the Eastern Cape (Phillips, 1951).

Parasciodema Poppius

Parasciodema Poppius, 1914a, pp. 104–105.

Parasciodema can be recognized by the following combination of characters: the pulvilli are large, and fused to nearly the entire ventral surface of the claw; the parempodia are hair-like and parallel; the body is elongate, and nearly parallel sided; the dorsum has only reclining, dark, setiform hairs; and the basic coloration is dark brown or black. *Parasciodema* is related to *Lasiolabopella*, *Lepidocapsus*, and *Eminoculus* by the structure of the pulvilli; it differs from *Lasiolabopella* in not having scale-like hairs, from *Lepidocapsus* in having only setiform hairs on the dorsum instead of setiform and woolly sericeous hairs (and also does not have an enlarged second antennal segment), and from *Eminoculus* in not having stylate eyes.

MALE GENITALIA: Figures 276–279. Vesica variously curved; phallosome L-shaped; left clasper trough-like; right clasper lanceolate.

Female unknown.

Parasciodema is endemic to southern Africa. No biological information is available for the genus.

***Parasciodema albicoxa*, new species**

Figures 74, 276–278

MACROPTEROUS MALE: Basic coloration dark brown; antennal segment 2 and all tibiae light brown; all coxae white, brown proximally; all femora and labial segments 2 and 3 yellow orange; labial segments 1 and 4 yellow; membrane smoky brown.

Entire body polished, shining; pronotum transversely rugose; dorsum with reclining, moderately long, black, setiform hairs; antennal segment 1 with a few decumbent hairs, segments 2, 3, and 4 with short, dense, reclining vestiture and scattered, semierect hairs about as long as diameter of segment 2; abdominal venter with reclining hairs; femora with a few very long, erect hairs on ventral surfaces; tibiae with semierect black spines about as long as tibial diameter.

Head strongly deflexed; vertex broad, posterior margin slightly concave; eyes large, protuberant, reaching posteriorly around anterolateral angles of pronotum, reaching ventrally to gula, anterior margins strongly sinuate; antennae inserted just above ventral margins of eyes, fossae contiguous with eyes; antennal segment 1 slightly enlarged, segment 2 tapered slightly proximally, distal diameter about equal to that of segment 1, segments 3 and 4 about two-thirds diameter of segment 2; bucculae small; gula obsolete; labium just surpassing mesocoxae; pronotum with anterior margin carinate, slightly upturned, lateral margins weakly concave, anterior and posterior margins nearly straight, disc slightly inclined posteriorly; mesoscutum and scutellum flattened, indistinctly separated; lateral corial margins nearly straight, widest at apex; cuneal incisure shallow, fracture angled slightly anteromedially; membrane with two cells; abdomen reaching almost to apex of cuneus; all tibiae lacking rows of tiny, closely spaced spines; metatarsal segment 1 slightly less than one-half length of segment 2, segments 2 and 3 subequal in length.

MEASUREMENTS: Total length 3.72, maximum width 1.48, length head .16, width head .90, interocular space .40, length pronotum .44, width pronotum 1.12, length scutellum .64, width scutellum .80, length corium 1.72, length clavus 1.44, length cuneus .76, width cuneus .36, length claval commissure .76, distance apex commissure-apex membrane 1.68, length metatibia 1.88; length antennal segments 1—.26, 2—1.08, 3—.62, 4—?; length labial segments 1—.34, 2—.38, 3—.20, 4—.30.

MALE GENITALIA: Figures 276–278.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Grootfontein, Middelburg, October, M. Johannessmeier (SANC).

PARATYPES: *Cape Province*—8 macropterous ♂♂, same data as holotype; 1 macropterous ♂, *idem*, 15.X.65 (Schoombey) (SANC, JAS, RTS).

This species is named for the light coxal coloration.

Parasciodema albicoxa is the only species in the genus with white coxae.

***Parasciodema nigrifemur*, new species**

Figures 75, 279

MACROPTEROUS MALE: Dark brown, including all appendages; vestiture and body surface as in *Parasciodema albicoxa*.

Structure very similar to *P. albicoxa* except as follows: eyes not reaching so far ventrally and leaving genae slightly exposed; pronotum moderately inclined posteriorly; hemelytra longer relative to total length (see measurements); abdomen reaching to about basal third of cuneus; male genital capsule with distinct keel ventrally.

MEASUREMENTS: Total length 4.68, maximum width 1.62, length head .18, width head .88, interocular space .40, length pronotum .52, width pronotum 1.24, length scutellum .68, width scutellum .72, length corium 2.64, length clavus 1.56, length cuneus .96, width cuneus .60, length claval commissure .88, distance apex commissure-apex membrane 2.44, length metatibia 1.96; length antennal segments 1—.28, 2—1.16, 3—.50, 4—?; length labial segments 1—.40, 2—.44, 3—.28, 4—.38.

MALE GENITALIA: Figure 279; left clasper and phallosome structurally very similar to those of *albicoxa*.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Grootfontein, Middelburg, October, M. Johannessmeier (SANC).

PARATYPES: 6 macropterous ♂♂, same data as holotype (SANC, RTS).

This species is named for the dark femoral coloration.

Parasciodema nigrifemur is the only species in the genus with totally dark colored legs.

***Parasciodema nitens* Poppius**

Parasciodema nitens Poppius, 1914a, p. 105.

This species is known only from the male holotype from "Seewald," South West Africa. Poppius (1914a) noted that the speci-

men was in the Berlin-Humboldt Museum; in fact it is in the Helsinki Museum (Type No. 11874). *P. nitens* has dark coxae and light femora, whereas *albicoxa* has nearly all white coxae and yellow femora and *nigrifemur* has dark brown coxae and femora.

Plagiognathidea Poppius

Plagiognathidea Poppius, 1914a, p. 99.

Males of *Plagiognathidea* (females are unknown) can be recognized by the following combination of characters: they are relatively small, light colored, elongate, nearly parallel sided, and flattened; the parempodia are hair-like, and parallel; the pulvilli are small; the head is strongly produced anteriorly, with the clypeus nearly reaching the distal end of antennal segment 1; and, the vesica is long, slender, and coiled (at least in *grisescens* Poppius). Poppius (1914a) related *Plagiognathidea* to *Plagiognathus* Fieber, but it appears to be most closely related to *Platyscytus* Reuter from South America on the basis of the general body form and the structure of the vesica.

Plagiognathidea contains only one described species, from "Nyassa-Geb, Langenberg." No biological information is available for the genus.

A mutilated male from Letaba River near Oliphants Camp, Kruger National Park, Transvaal (deposited in the J. A. Slater Collection), probably represents a new species of *Plagiognathidea*. The body form is similar, but the antennal proportions are very much different, from those of *grisescens*, the holotype of which is in the Helsinki Museum (Type No. 12300).

Psallus Fieber

The cosmopolitan genus *Psallus* Fieber is well known only in Europe. Wagner (1952) and Woodroffe (1957) have given reasonably complete treatments of the Western European and British species respectively, but no comprehensive work of a wider geographic scope is available. The extremely large size and wide distribution of the genus make it impossible to accurately determine specimens or describe new species at the present time, unless a comprehensive analysis is undertaken.

Poppius (1914a) recorded three species of *Psallus* from the Ethiopian Region—two from St. Helena and one, *P. dilutipes* Reuter, from Algoa Bay, South Africa. Odhiambo (1958c; 1959b) has described 13 additional species from East Africa (see below).

I have studied approximately 10 species from South Africa that are referable to *Psallus*. Most are light green or yellow green and some have brown spots on the dorsum. The dorsum is usually covered with reclining, light or dark, setiform hairs and also decumbent, wooly, sericeous hairs, although the latter type of pubescence is not present in all species. The femora and tibiae often have dark spots at the bases of the spines. The parempodia are either hair-like and parallel or weakly fleshy and apically convergent (as in *Ellenia*). Odhiambo (1959b) noted that some species of *Psallus* have a ventral keel on the male genital capsule, but I am placing these species in *Ellenia* (see page 158).

***Pseudosthenarus* Poppius**

Pseudosthenarus Poppius, 1914a, p. 98.

Pseudosthenarus can be characterized as follows—

MACROPTEROUS MALE: Large, robust, black; body surface dull or weakly shining; entire body covered with wooly, sericeous hairs and reclining, black, setiform hairs; eyes with short hairs; antennal segments 2, 3, and 4 with dense, short, reclining vestiture and scattered semierect hairs about as long as diameter of segment 2; ventral surfaces of all femora with a few, very long, fine, erect hairs.

Head declivous, nearly vertical; eyes granular, moderately large, occupying about two-thirds total height of head, anterior margins sinuate; vertex weakly convex, posterior margin ecarinate or with a very low rounded carina; antennae inserted at level of ventral margin of eyes, fossae contiguous with eyes; antennal segment 1 slightly enlarged, usually with a few semierect black spines, segment 2 cylindrical or tapering slightly proximally, segments 3 and 4 about two-thirds diameter of segment 2; apex of clypeus directed posteriorly; bucculae narrow; gula obsolete; labium just reaching to trochanteral joint of procoxae; pronotum only slightly inclined posteriorly, all margins nearly straight, anterior margin finely carinate and upturned; calli weak, widely separated; mesoscutum separated from weakly convex scutellum by deep transverse impression; lateral corial margins convexly rounded, broadest at about midpoint; cuneal incisure shallow, fracture angled slightly anteromedially; membrane with two cells; abdomen reaching to about middle of cuneus; metafemora enlarged, greatest width slightly less than interocular space; all tibiae with rows of tiny closely-spaced spines and heavy black, semierect spines; metatarsal segment 1 about one-half length of segment 2, segments 2 and 3 subequal in length; tarsal claws long, gently curved,

slightly broadened basally; parempodia hair-like parallel; pulvilli minute, attached at midpoint of claw.

MALE GENITALIA: Figures 293–312. Structure unusual in Phyllinae, characteristic for genus; phallus composed of gently curved vesica proper and also a sickle-shaped structure situated below main body of organ, gonopore apical; phallosome similar in all species; left clasper flattened, splayed out, derivable from other phylines through *Parapseudosthenarus*; right clasper lanceolate.

SUBMACROPTEROUS FEMALE: Coloration and body surface texture generally as in males; antennal segment 2 usually somewhat lighter than in males.

Eyes smaller and vertex relatively wider than in males; antennal segment 2 somewhat more slender than in males; pronotum shorter and more strongly flattened than in males; hemelytra reduced, but differentiated; abdomen not quite reaching to apex of membrane.

FEMALE GENITALIA: Figures 313, 314. Posterior wall a simple sclerotized plate; sclerotized rings rather strongly infolded laterally.

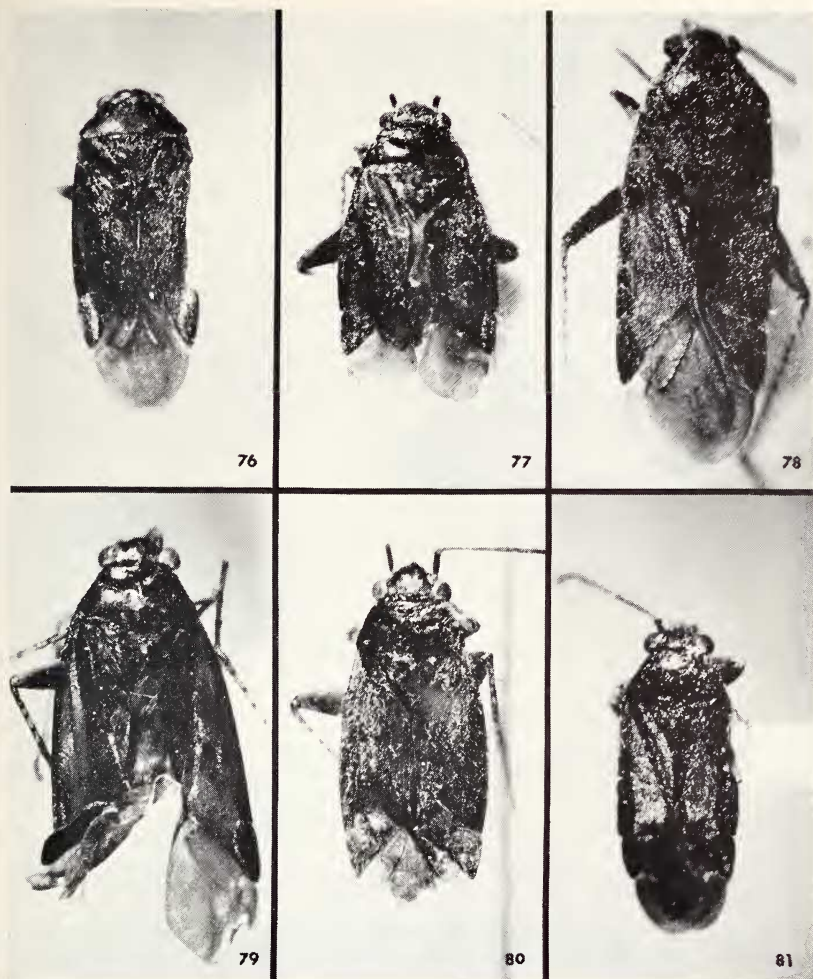
Pseudosthenarus can be most easily recognized in South Africa by the setiform and wooly hairs on the dorsum, the nearly solid black coloration with some yellow or white on the legs and antennae, and the form of the male genitalia. The left clasper of the male possesses the most useful characters for separating the species; the structure of the vesica is of little use in this regard.

Pseudosthenarus was synonymized with *Sthenarus* by Carvalho (1952a), but as can be determined from comparison of the male genitalia of *Pseudosthenarus* and *Sthenarus*, this action was incorrect. Carvalho probably based this synonymy on an examination of *P. nigricornis* Poppius (holotype in British Museum [Natural History]), which is not the type species of the genus. The male genitalia of this species are very much different than those of males of *Pseudosthenarus* from South Africa, including *P. ater* Poppius, the type species of the genus (see *Sthenarus nigricornis*).

Pseudosthenarus is actually most closely related to *Parapseudosthenarus* in general body form and structure of the male genitalia, although the genitalia of the former appear to be more highly derived than those of the latter.

Odhiambo (1958a) described a species *solani* in *Pseudosthenarus*, but it must be placed in a new genus (see *Odhiamboella*, page 175).

Pseudosthenarus as now understood contains four species and is restricted to the Southwest Cape Region of South Africa. No host or biological data are available for any members of the genus.



FIGS. 76-81. Phylini. Fig. 76. *Pseudosthenarus* near *ater*, male (Calvinia, Cape Province). Fig. 77. *Pseudosthenarus* near *ater*, female (Ceres, Cape Province). Fig. 78. *Pseudosthenarus grossus*, male, holotype. Fig. 79. *Pseudosthenarus namaquaensis*, male, holotype. Fig. 80. *Pseudosthenarus namaquaensis*, female (Kamieskroon, Cape Province). Fig. 81. *Pseudosthenarus rozeni*, male, holotype.

KEY TO MALES OF *Pseudosthenarus*

1. Length at least 4.40 mm.; ratio of length of antennal segment 2 to width of head 3:2 2
 Length under 3.50 mm.; ratio of length of antennal segment 2 to width of head about 4:3 or less 3
2. Femora and vertex completely black *grossus* (Fig. 78)
 Femora mostly yellowish with black markings; vertex with yellow brown markings contiguous with eyes *namaquaensis* (Fig. 79)
3. Ratio of length of antennal segment 2 to width of head 4:3; all tibiae nearly white, lacking black bands *rozeni* (Fig. 81)
 Ratio of length of antennal segment 2 to width of head 5:4; all tibiae yellow with black bands *ater* (Fig. 76)

***Pseudosthenarus ater* Poppius**

Figures 76, 77, 293–302

Pseudosthenarus ater Poppius, 1914a, p. 98.

The holotype female of *Pseudosthenarus ater*, from Cape Town, is deposited in the Helsinki Museum (Type No. 12074). Additional specimens of *Pseudosthenarus* are now available and the problem of the identification of the male of *ater* arises. The sexual color dimorphism in the antennae of this species appears to be rather variable. In a long series of specimens from Rust en Vrede, Oudtshoorn District, the second antennal segment distally and the entire third and fourth antennal segments are brown with most of segment 2 being yellow, whereas in the holotype, antennal segments 2, 3, and 4 are entirely yellow. This type of variation applies in a confusing way to specimens from all of the localities listed below.

Apparently more than one species is present, based on the structure of the male genitalia. Figure 295 shows the left clasper of a male from the Cape of Good Hope, Figure 302 of a male from Calvinia; males from Rust en Vrede have the left clasper almost identical with the specimen from the Cape of Good Hope. The two claspers figured appear to represent those of different species, but deciding which is *ater*, if in fact either is, cannot be determined without further field work and additional specimens.

P. ater can be separated from other members of the genus by the characters given in the key.

MALE GENITALIA: Figures 293–302.

MEASUREMENTS: Macropterous ♂ (Rust en Vrede)—Total length 3.28, maximum width 1.40; length antennal segment 2—.88.

SPECIMENS EXAMINED: *Cape Province*—submacropterous ♀, Cape Town, Dr. Martin (holotype); 1 macropterous ♂, Cape of Good

Hope (Darwin); 2 macropterous ♂♂, 1 submacropterous ♀, Cape Province, Calvinia, XI.1931 (Mackie); 1 submacropterous ♀, Ceres, Cape Province, 1500 ft., Jan. 1921 (Turner); 13 macropterous ♂♂, 9 submacropterous ♀♀, Rust en Vrede, Oudtshoorn Dist., Mus. Expd., Oct. 1951 (HM, SAM, BM[NH], JAS, RTS).

***Pseudosthenarus grossus*, new species**

Figures 78, 303–305

MACROPTEROUS MALE: Large; generally dull black or brownish black; profemora distally and all tibiae and tarsi light yellow brown; tibial spines with black bases forming black bands.

MEASUREMENTS: Total length 4.80, maximum width 1.72, length head .24, width head .84, interocular space .48, length pronotum .56, width pronotum 1.40, length scutellum .72, width scutellum .84, length corium 3.00, length clavus 1.84, length cuneus .76, width cuneus .48, length claval commissure 1.08, distance apex commissure-apex membrane 2.10, length metatibia 2.32; length antennal segments 1—.32, 2—1.30, 3—?, 4—?; length labial segments 1—.30, 2—.26, 3—.10, 4—.14.

MALE GENITALIA: Figures 303–305.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Het Kruis, Mus. Expd., Oct. 1947 (SAM).

PARATYPES: *Cape Province*—1 macropterous ♂, same data as holotype; 1 macropterous ♂, Goedehoop, Heidelberg Dist., Mus. Expd., Oct. 1951 (SAM, RTS).

This species is named for its very large size.

This is the only species of *Pseudosthenarus* in which the femora are totally black.

***Pseudosthenarus namaquaensis*, new species**

Figures 79–80, 308–314

MACROPTEROUS MALE: Large, elongate species; generally dull black or brownish black; femora and tibiae yellow, femora black on ventral surfaces, tibial spines with black bases; tarsal segments 1 and 2 light, 3 dark; vertex with a rounded yellow orange spot adjacent to mesial margin of each eye; membrane smoky brown.

MEASUREMENTS: Total length 4.40, maximum width 1.68, length head .24, width head .92, interocular space .44, length pronotum .56, width pronotum 1.32, length scutellum .72, width scutellum .92, length corium 2.28, length clavus 1.80, length cuneus .88, width cuneus .44, length claval commissure 1.00, distance apex

commissure-apex membrane 2.00, length metatibia 2.36, length antennal segments 1—.36, 2—1.60, 3—1.00, 4—?; length labial segments 1—.30, 2—.24, 3—.14, 4—.08.

MALE GENITALIA: Figures 308–312.

SUBMACROPTEROUS FEMALE: Coloration generally as in male, except antennal segments 1 and 2 yellowish, especially on dorsal surface; mesothoracic and metathoracic pleura and all coxae generally light brown or yellow; black markings on femora either few in number or absent.

Structurally differing from male as in generic diagnosis.

FEMALE GENITALIA: Figures 313, 314.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Kamieskroon, Namaqualand, Sept. 1930, Mus. Staff (SAM).

PARATYPES: *Cape Province*—8 macropterous ♂♂, 25 submacropterous ♀♀, same data as holotype; 1 macropterous ♂, Bowesdorp, Namaqualand, Sept. 1941; 1 submacropterous ♀, Lamberts Bay, Nov. 1956 (SAM, JAS, RTS).

This species is named for its occurrence in Namaqualand.

Pseudosthenarus namaquaensis can be separated from *grossus*, the only other large species in the genus, by the yellow coloration of the femora.

***Pseudosthenarus rozeni*, new species**

Figures 81, 306, 307

MACROPTEROUS MALE: Generally dull black; extreme distal portion of femora and all tibiae white; tibial spines black but without black bases, black bands not formed on tibiae; tarsi dark brown; membrane smoky black.

MEASUREMENTS: Total length 3.32, maximum width 1.32, length head .12, width head .76, interocular space .36, length pronotum .52, width pronotum 1.08, length scutellum .48, width scutellum .68, length corium 1.56, length clavus 1.24, length cuneus .56, width cuneus .32, length claval commissure .68, distance apex commissure-apex membrane 1.52, length metatibia 1.80; length antennal segments 1—.20, 2—1.00, 3—.60, 4—?; length labial segments 1—.24, 2—.24, 3 and 4—.18.

MALE GENITALIA: Figures 306, 307.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Kommetjie, X-29-XI-1966, J. G. Rozen Collector (AMNH).

This species is named for the collector Dr. J. G. Rozen, of the American Museum of Natural History.

Pseudosthenarus rozeni can be grouped with *P. ater* on the basis of its small size. The ratio of the length of the second antennal segment to the width of the head across the eyes, however, is somewhat different than in *ater* and the tibial spines do not have black bases.

"*Sthenarus-Campylomma*"

Although little mention is made of the fact in the literature, *Campylomma* Reuter and *Sthenarus* Fieber, as presently constituted, may be in large part synonymous. Both genera have European type species and revision on a world basis has never been carried out. Leston (see Carvalho and Leston, 1952) and Odhiambo (1958a) have pointed out some of the problems in the taxonomy of *Sthenarus*. Both *Campylomma* and *Sthenarus* occur primarily in the Old World, but a limited number of species of *Sthenarus* have been described from North America and *Campylomma verbasci* Meyer is introduced there (Knight 1941; 1968).

Poppius (1914a) recorded six species of *Sthenarus* and two species of *Campylomma* from Africa, but none specifically from South Africa. Carvalho et al. (1960), incorrectly recorded *Paramixia australis* from South Africa as *Sthenarus basalis* Poppius.

I have examined type material of *Sthenarus vestitus* Poppius and *Campylomma angustior* Poppius from Africa. The main generic difference between the two species seems to be color. It is therefore possible that at least species from Africa recorded under the two generic names may in fact all be members of a single genus.

In South Africa there are at least eight species that resemble *Campylomma* and *Sthenarus*, but accurate determinations cannot be made at this time. They can generally be recognized by their very small size and head that is concave behind. See also discussion under *Sthenarus nigricornis*.

NOTES ON EXTRALIMITAL SPECIES

Sthenarus nigricornis (Poppius)

Pseudosthenarus nigricornis Poppius, 1914a, p. 99.

Sthenarus nigricornis (Poppius) is not congeneric with *P. ater*, the type species of *Pseudosthenarus*, and I am therefore temporarily placing it in *Sthenarus* as per Carvalho (1952a). The general facies of *nigricornis* are very similar to those of *ater* but it differs in having a much longer and more slender labium and genitalia of a quite different structure. The vesica of *nigricornis* is much more similar to the type found in *Sthenarus* than in *Pseudosthenarus* as I have been

able to determine by examination of the holotype of *nigricornis* in the British Museum (Natural History).

Stoebea, new genus

MACROPTEROUS MALE: Small, elongate; dorsum smooth, dull, densely covered with moderately long, reclining setiform hairs (dark on dark background areas, light on light areas), and decumbent, wooly, sericeous hairs; anterolateral angles of pronotum with a single, long, erect, fine spine; eyes with short hairs; antennae with short, decumbent, light vestiture; thoracic pleura (sparsely) and abdominal venter with reclining light hairs; femora with a few long, erect, very fine hairs on ventral surfaces; tibiae and tarsi with reclining light hairs; tibiae with semierect dark spines, slightly longer than tibial diameter, with dark bases.

Head nearly vertical; eyes weakly granular, relatively small, only slightly protuberant, confluent with anterolateral angles of pronotum, occupying three-fourths of height of head; vertex convex, posterior margin straight, ecarinate; frons strongly convex; antennae inserted just above level of ventral margins of eyes, fossae nearly contiguous with eyes; antennal segment 1 moderately enlarged, segment 2 nearly cylindrical, of slightly smaller diameter than segment 1, segments 3 and 4 about one-half diameter of segment 2; bucculae slightly expanded; gula short; labium reaching to posterior margin of abdominal sternite 5; pronotum with anterior margin finely carinate, upturned; calli obsolete; mesoscutum and scutellum nearly flat; lateral corial margins nearly straight; cuneal incisure obsolete, fracture slightly angled anteromedially; membrane with two cells; abdomen reaching to about midpoint of cuneus; legs long; metafemora enlarged, flattened; metatibiae with rows of tiny, closely-spaced spines; metatarsal segment 1 about one-third length of segment 2, segments 2 and 3 subequal in length; tarsal claws long, slender, evenly curved, slightly broadened basally; parempodia hair-like, parallel; pulvilli minute.

MALE GENITALIA: Figures 280–285. Vesica S-shaped, strongly twisted, with a single attenuated apical spine, gonopore subapical; phallosome similar in all species; left and right claspers typical of *Phylini*.

BRACHYPTEROUS FEMALE: See *S. barbertonensis*.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

TYPE SPECIES: *Stoebea barbertonensis*, new species.

This genus is named for the host plant genus, *Stoebe*.

Stoebea is characterized by its small size, light coloration with green orange, or reddish marking, vestiture of erect setiform and

decumbent, wooly, sericeous hairs, and second antennal segment which is usually about $3\frac{1}{2}$ times as long as the width of the interocular space. *Stoebea* resembles *Erythrocorista* Lindberg (1958) from the Cape Verde Islands; this is only superficial, however, for *Erythrocorista* is an orthotyline (see page 282).

Stoebea is presently known only from South Africa. Where host plant data are available the genus occurs on species of *Stoebe* (Compositae).

Specimens of *Stoebea* from South Africa that may represent new species in addition to those described below, are a male from Rust en Vrede, Oudtshoorn District, Cape Province (deposited in the South African Museum) that closely resembles *S. elginensis*, a male from Lyttelton, Pretoria, Transvaal (deposited in J. A. Slater Collection), which appears to be closely related to *S. plettenbergensis*, and a female from Johannesburg, Transvaal (deposited in J. A. Slater Collection), that may be the same species as the Lyttelton specimen.

***Stoebea barbertonensis*, new species**

Figures 82, 280–282

MACROPTEROUS MALE: Head light orange with greenish suffusion around eyes, jugae, and bucculae; pronotum mostly white along lateral margins and midline, otherwise amber, anterior margin medially and posterolateral angles suffused with green; scutellum amber; anterior half of clavus, corium on basal fifth, corium faintly along anterior three-fourths of lateral margin, corium at level of apex of clavus, and cuneus white; remainder of corium and clavus amber (tending to gray brown), in some areas with distinct brown spots at bases of setiform hairs; posteromesial margin of cuneus and veins of membrane yellow; membrane smoky brown; antennae, coxae, and tarsi brown or light brown; thoracic pleura and abdominal venter yellow or yellow brown; abdomen heavily green; femora nearly white on proximal half, brown on distal half, with some small, round, dark, brown spots; tibiae nearly white, spines with small dark bases.

MEASUREMENTS: Total length 3.20, maximum width 1.08, length head .28, width head .65, interocular space .32, length pronotum .36, width pronotum .96, length scutellum .44, width scutellum .52, length corium 1.48, length clavus 1.28, length cuneus .60, width cuneus .36, length claval commissure .68, distance apex commissure-apex membrane 1.40, length metatibia 1.92; length antennal segments 1—.28, 2—1.24, 3—.52, 4—.20; length labial segments 1—.34, 2—.36, 3—.30, 4—.38.

MALE GENITALIA: Figures 280–282.

BRACHYPTEROUS FEMALE: Basic coloration, body surface, and vestiture as in macropterous male.

Eyes smaller than in male, vertex relatively wider; hemelytra just covering abdomen; cuneus and membrane strongly reduced; lateral corial margins broadly rounded, convex.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

MEASUREMENTS: Total length 2.64, maximum width 1.24, width head .72, interocular space .44.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, 22 mi. S. Barberton, 4900 ft. elevation, 24 Mar. 1968, T. Schuh, J. A. & S. Slater, M. Sweet (Adults and nymphs on *Stoebe vulgaris* Levyns) (SANC).

PARATYPES: *Transvaal*—9 macropterous ♂♂, 13 brachypterous ♀♀, same data as holotype; 2 macropterous ♂♂, 1 brachypterous ♀, 14 mi. S. Barberton, 5200 ft. elevation, 24 Mar. 1968 (Adults and nymphs on *Stoebe vulgaris* Levyns) (SANC, BM[NH], JAS, RTS).

ADDITIONAL SPECIMENS: 1 macropterous ♂, 1 brachypterous ♀, 6 nymphs (in alcohol), same data as holotype (RTS).

This species is named for the town of Barberton.

Stoebe barbertonensis is the only species of *Stoebe* in which all of the antennal segments are brown; in *plettenbergensis* antennal segment 1 is almost entirely white. Both *barbertonensis* and *plettenbergensis* have the distal half of the metafemora distinctly darker than the proximal half, whereas in *elginensis* the metafemora are generally light with only a few dark spots distally. The coloration of *elginensis* is distinctly reddish whereas the other two species are usually green or yellow, sometimes grading to brown.

This species is known only from *Stoebe vulgaris* Levyns (Compositae). The host genus is restricted to Africa and the Mascarene Islands and is massed in the South West Cape region in South Africa (Phillips, 1951). Type locality of *barbertonensis* and nearby collecting localities have typically South West Cape type vegetation, including *Erica*, *Stoebe*, *Protea*, etc.

***Stoebe elginensis*, new species**

Figures 283, 284

MACROPTEROUS MALE: Basic coloration very light, yellowish; midline of head and pronotum, posterior corners of pronotum, clavus broadly along scutellum and commissure, entire exocorium, and base of cuneus white; endocorium and clavus broadly along claval suture dull reddish; remainder of dorsum yellow to light yellow brown;

cells of membrane including veins and posterior and lateral margins (broadly) smoky brown; membrane just posterior to cuneus and mesiad of cells white; extreme base of membrane dark brown; metatibiae with some faint dark spots on apical half; tibial spines with weak dark spots at bases; all tarsal segments 3 brown; antennal segment 2 distally and segments 3 and 4 infusate; labial segment 4 brown.

Body surface and vestiture as in generic discussion.

Head produced anteriorly, clypeus visible from above.

MEASUREMENTS: Total length 3.40, maximum width 1.28, length head .36, width head .64, interocular space .36, length pronotum .36, width pronotum 1.08, length scutellum .48, width scutellum .68, length corium 1.60, length clavus 1.20, length cuneus .60, width cuneus .32, length claval commissure .64, distance apex commissure-apex membrane 1.56, length metatibia 1.76; length antennal segments 1—.26, 2—1.08, 3—.72, 4—?; length labial segments 1—.44, 2—.44, 3—.40, 4—.40.

MALE GENITALIA: Figures 283, 284.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Elgin Forest Reserve, 10.iii.1954, at light, 1000 ft., Caledon District, J. Balfour-Brown, BM. 1954-797 (BM[NH]).

PARATYPES: *Cape Province*—1 macropterous ♂, same data as holotype; 1 macropterous ♂, Bainskloof Pass Summit, 21 Jan. 1968, UV Light (BM[NH], RTS).

This species is named for the Elgin Forest near Somerset West. See discussion under *barbertonensis*.

***Stoebea plettenbergensis*, new species**

Figure 285

MACROPTEROUS MALE: Basic coloration of dorsum white; head weakly and irregularly, pronotum broadly on either side of midline, mesoscutum, scutellum, elongate oval marking along claval suture, diffuse quadrate marking at apex of endocorium, and apex of cuneus along mesial margin light orange; head, anterior lobe of pronotum, and mesoscutum with slightly greenish tinge; membrane generally whitish; cells and veins of membrane, area posteriad of cuneus and small cell, and margin of membrane (narrowly) smoky brown; antennal segment 1 white, segment 2 white proximally, weakly infusate distally, segments 3 and 4 brown; basal half of labium light colored, apical half infusate; venter and legs generally cream; femora generally with scattered, small brown spots; metafemora brown

on distal third; tibial spines with dark bases; thoracic pleura weakly suffused with orange and green; abdominal venter sublaterally with weak brown longitudinal stripe; all tarsal segments 3 brown.

MEASUREMENTS: Total length 2.64, maximum width 1.08, length head .12, width head .62, interocular space .32, length pronotum .36, width pronotum .92, length scutellum .36, width scutellum .52, length corium 1.36, length clavus .88, length cuneus .48, width cuneus .28, length claval commissure .64, distance apex commissure-apex membrane 1.16, length metatibia 1.60; length antennal segments 1—.22, 2—1.06, 3—.60, 4—.34; length labial segments 1—.26, 2—.30, 3—.28, 4—.36.

MALE GENITALIA: Figure 285.

BRACHYPTEROUS FEMALE: Basic coloration and vestiture as in male.

Structural modifications as in female of *barbertonensis*.

MEASUREMENTS: Total length 2.12, maximum width 1.14, width head .64, interocular space .40.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, 6 mi. E. Plettenberg Bay, elevation 500 ft., 12–13 Feb. 1968, J. A. & S. Slater, T. Schuh, M. Sweet (Adults and nymphs on *Stoebe plumosa* Thunb.) (SANC).

PARATYPES: 5 macropterous ♂♂, 5 brachypterous ♀♀, same data as holotype; 1 brachypterous ♀, 4 mi. W. Gydo Pass Summit, N. of Ceres, 26 Jan. 1968 (SANC, JAS, RTS).

This species is named for the type locality near Plettenberg Bay. See discussion under *barbertonensis*.

This species is known to occur only on *Stoebe plumosa* Thunb.

Widdringtoniola, new genus

MACROPTEROUS MALE: Small, stout bodied; body surface smooth, dull or weakly shining; dorsum with reclining, black, setiform hairs about as long as diameter of antennal segment 1; all antennal segments with short, decumbent, black hairs; antennal segment 1 with a few, erect, fine black spines, segments 2, 3, and 4 with relatively short, reclining, fine, light hairs; abdominal venter with short, decumbent, dark hairs; tibiae with reclining dark hairs of length slightly less than diameter of tibia and a few semierect dark spines about equal in length to tibial diameter.

Head short, broad; eyes rather small, finely granular; frons viewed from above and from side strongly convex; anterior margins of eyes strongly sinuate; antennae inserted just above level of ventral margin of eyes, fossae contiguous with eyes; antennal segment 1 only

slightly enlarged, segment 2 cylindrical, about equal in diameter to segment 1, segments 3 and 4 about two-thirds diameter of segment 2; height of genae about one-third height of eye; bucculae narrow; gula obsolete; mesoscutum and scutellum nearly flat; hemelytra nearly parallel sided; cuneal incisure shallow, fracture slightly angled anteromedially; membrane with two cells; abdomen reaching middle of cuneus; only metatibiae with rows of tiny closely-spaced spines; tarsal claws moderately long, weakly curved, slightly broadened basally; parempodia weakly fleshy, convergent apically; pulvilli minute.

MALE GENITALIA: Figures 286–288. Vesica S-shaped, twisted, with single attenuated apical spine subtended by well developed gonopore; phallosome and claspers typical of Phylini.

MACROPTEROUS FEMALE: See *W. kirstenboschiana*.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

TYPE SPECIES: *Widdringtoniola kirstenboschiana*, new species.

This genus is named for the host plant genus, *Widdringtonia*.

Widdringtoniola most closely resembles species of *Campylomma* by virtue of its small size and light yellowish coloration. The parempodia are similar to those found in some *Campylomma* species and also in *Ellenia*, being weakly fleshy and convergent apically. *Widdringtoniola* has the posterior margin of the vertex poorly defined and not carinate and the anterior margin of the pronotum is not obscured by the head, whereas in *Campylomma* the head obscures the anterior margin of the pronotum. The prominently bulging frons and reclining, heavy, black setae on the dorsum are also diagnostic of the genus.

***Widdringtoniola kirstenboschiana*, new species**

Figures 83, 286–288

MACROPTEROUS MALE: Basic coloration light yellow or greenish yellow; antennal segments 3 and 4 infusate.

Eyes with extremely short hairs.

Labium not quite surpassing mesocoxae; pronotal calli very low, separated medially, with a weak, transverse impression along posterior margin; pronotum with anterior margin sinuate, lateral margins straight, nearly parallel, posterior margin nearly straight medially, convex laterally; metatarsal segment 1 about one-half length of segment 2, segment 2 about one-half length of segment 3.

MEASUREMENTS: Total length 2.52, maximum width .96, length head .20, width head .68, interocular space .36, length pronotum .36, width pronotum .84, length scutellum .32, width scutellum .48, length corium 1.20, length clavus .88, length cuneus .40,

width cuneus .26, length claval commissure .96, distance apex commissure-apex membrane 1.12, length metatibia 1.38; length antennal segments 1—.18, 2—.90, 3—.42, 4—.26; length labial segments 1—.18, 2—.18, 3—.07, 4—.18.

MALE GENITALIA: Figures 286–288.

MACROPTEROUS FEMALE: Similar to male except as follows: eyes slightly smaller than in male, vertex relatively wider; antennal segment 1 of slightly greater diameter than segment 2, segments 3 and 4 nearly equal in diameter to segment 2; lateral pronotal margins distinctly rounded; lateral corial margins weakly convex, body appearing ovoid; abdomen just surpassing apex of cuneus.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*, Kirstenbosch Gardens, Cape Town, 29 Jan. 1968, J. A. & S. Slater, T. Schuh, M. Sweet (Adults and nymphs on *Widdringtonia cupressoides* [L.] Endl.) (SANC).

PARATYPES: 25 macropterous ♂♂, 19 macropterous ♀♀, same data as holotype. *Transvaal*—4 macropterous ♂♂, 9 macropterous ♀♀, Pretoria, Meintjies Kop, 19 Mar. 1968 (Adults and nymphs on *Widdringtonia cupressoides* [L.] Endl.); 1 macropterous ♂, 7 macropterous ♀♀, Woodbush, T.P., Nov. 1932, Govt. Forester (numerous on *Widdringtonia*) (SANC, TM, SAM, BM[NH], JAS, RTS).

This species is named for the Kirstenbosch Gardens, Cape Town. See generic discussion.

Widdringtoniola kirstenboschiana is apparently host specific on *Widdringtonia cupressoides* (L.) Endl. The host genus is restricted to southern Africa, extending north to eastern Rhodesia and Malawi. *W. cupressoides* is restricted to Table Mountain and the forests eastward to King Williamstown District (Hutchinson, 1946). The records of *kirstenboschiana* from Pretoria are from the host species introduced as an ornamental planting.

TRIBE PILOPHORINI

Aloea Linnavuori

Aloea Linnavuori (in press).

Aloea can be distinguished from all other genera with convergent recurved parempodia by its small size, unique red and cream coloration, and phyline genitalia. The genus is most closely related to *Neoambonea*, *Parambonea*, and *Ambonea*.

MALE GENITALIA: Figures 318–320. Vesica U-shaped, not

twisted, with poorly developed, subapical gonopore, form very similar to that found in *Neoambonea* and *Ambonea*; phallosome somewhat L-shaped; left clasper splayed out, wing-like, nearly identical in structure to that of *Neoambonea* and *Parambonea*; right clasper lanceolate.

FEMALE GENITALIA: Figures 315–317. Posterior wall a simple sclerotized plate, with posterior margin strongly evaginated; sclerotized rings weakly infolded laterally.

This genus is apparently restricted to the host genus *Aloe* (Liliaceae) in the Ethiopian Region. Linnavuori (in press) has described four species from North Africa and Yemen, all occurring on species of *Aloe*. These tiny mirids live on the leaves of the plants, generally secreting themselves in the base of the rosette. When disturbed they run very rapidly to the undersides of the leaves. The extremely rapid movements make them difficult to catch. During my collecting I did not observe any specimens take flight.

***Aloea australis*, new species**

Figure 84

MACROPTEROUS MALE: Head, antennae, labium, scutellum, hemelytra, and legs cream except as noted below; base of antennal segment 1, juga, lora, pronotum, mesoscutum, extreme base of hemelytra, apex of corium (broadly), and mesial margin of cuneus red; thoracic pleura and venter, mesocoxae and metacoxae proximally, and abdomen maroon; genital capsule cream apically.

Body surface and vestiture as in *A. samueli*.

Structure very similar to that of *A. samueli* except as follows: gula obsolete, buccal cavity reaching to posterior margin of head; veins of membrane forming nearly right angle posteromedially.

MEASUREMENTS: Total length 2.96, maximum width 1.12, length head .20, width head .84, interocular space .44, length pronotum .32, width pronotum .88, length scutellum .44, width scutellum .52, length corium 1.36, length clavus .54, length cuneus .48, width cuneus .28, length claval commissure .32, distance apex commissure–apex membrane 1.32, length metatibia 1.28; length antennal segments 1—.28, 2—.82, 3—?, 4—?; length labial segments 1—.44, 2—.46, 3—.10, 4—.10.

MALE GENITALIA: Very similar to *A. samueli*.

FEMALE: See discussion below.

FEMALE GENITALIA: See *A. samueli*.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: Transvaal, Pretoria, April 66, H. K. Munro (Host plant—*Aloe* spp.) (SANC).

PARATYPES: 10 macropterous ♂♂, same data as holotype (RTS).

ADDITIONAL SPECIMENS: *Transvaal*—1 macropterous ♂, 15 submacropterous ♀♀, same data as holotype; 4 macropterous ♂♂, 9 submacropterous ♀♀, Pretoria, 23.11.1926 (Munro); 1 submacropterous ♀, Pretoria, XI.1957 (Vari) (SANC, TM, BM[NH], JAS, RTS).

This species is named for its occurrence in southern Africa.

Aloea australis resembles *samueli* very closely but differs as follows: the bases of the hemelytra in *australis* are red whereas in *samueli* they are cream; the mesial margin of the cuneus is red in *australis* and cream in *samueli* (see below); the general body form is more robust in *samueli* than in *australis* which is particularly noticeable in the ratio of the length to width of the scutellum (see measurements).

In the paratypic series of *australis* all of the included specimens are males and have the cuneus red only on the mesial margin. Nearly all of the specimens listed under "additional specimens" have the cuneus entirely red, but are structurally nearly identical to the paratypes, including the form of the male genitalia. It is possible that two species are present here, but only further field work will determine this.

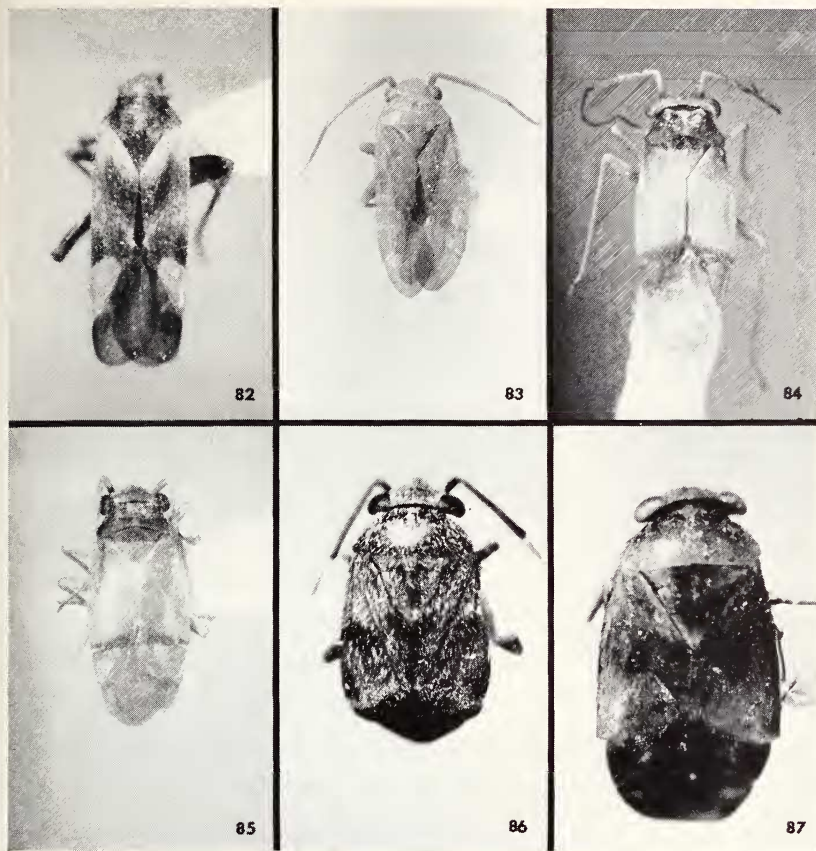
Three males and seven nymphs taken on *Aloe* sp. at the Oliphants River near the Oliphants Camp, Kruger National Park (deposited in the J. A. Slater Collection), almost certainly represent an additional new species of *Aloea*, based on their coloration and antennal proportions, which differ from *australis* and *samueli*.

Aloea samueli, new species

Figures 85, 315–320

MACROPTEROUS MALE: Small, elliptical; hemelytra (except as noted below), most of head, antennae, labium, and legs cream; pronotum, mesoscutum, and narrow transverse fascia along cuneal fracture (interrupted only at base of membrane), and apex of juga red; head weakly suffused with red; antennal segment four brown; genital capsule cream, suffused with red; remainder of venter deep reddish brown.

Entire body dull; head, pronotum (particularly anterior half), thorax, and abdomen laterally with decumbent, flattened, sericeous hairs; dorsum also with reclining, golden hairs; all antennal segments with decumbent, short, light hairs, segment 1 with one or two erect, light spines on interior surface, segment 2 with an irregular row of



FIGS. 82-87. Phylini, Pilophorini. Fig. 82. *Stoebea barbertonensis*, male, holotype. Fig. 83. *Widdringtoniola kirstenboschiana*, male (Pretoria, Transvaal). Fig. 84. *Aloea australis*, male, holotype. Fig. 85. *Aloea samueli*, male, holotype. Fig. 86. *Ambonea munroi*, male (Rustenburg, Transvaal). Fig. 87. *Ambonea rustenburgensis*, male, holotype.

erect, light hairs, slightly longer than segmental diameter, on latero-ventral surface (with antennae lying back over body); ventral surfaces of femora with several long, erect, fine, light hairs; abdominal venter with decumbent light hairs; tibiae with a few semierect light spines, about as long as tibial diameter.

Head strongly declivous, vertex and frons broad, flat; posterior margin of vertex finely carinate; eyes moderately large, protuberant,

antennae inserted at level of ventral margin of eyes, fossae removed from eyes by distance nearly equal to diameter of antennal segment 2; antennal segment 1 moderately enlarged, segment 2 cylindrical, about two-thirds diameter of segment 1, segments 3 and 4 about two-thirds diameter of segment 2; clypeus enlarged, broad, flattened, curved posteroventrally; bucculae small; gula about as long as two times diameter of antennal segment 1; labial segment 4 flattened dorsoventrally, nearly twice as broad as segment 3; labium just surpassing mesocoxae; pronotum with anterior margin finely carinate, upturned, calli small, widely separated, distinctly raised; posterior margin of pronotum forming distinct inverted "V" across mesoscutum; scutellum flat; corium weakly convex laterally, widest slightly posterior to level of midpoint of claval commissure; cuneal incisure shallow, fracture nearly perpendicular to corial margin; membrane very long, with two cells, posterior margin of cells evenly rounded; abdomen reaching to apex of cuneus; only metatibiae with rows of tiny, closely-spaced spines; metatarsal segments 1 and 2 subequal in length, segment 3 about $1\frac{1}{2}$ times length of segment 2; tarsal claws relatively short, weakly curved; parempodia fleshy, convergent apically, recurved; pulvilli minute.

MEASUREMENTS: Total length 2.60, maximum width 1.12, length head .16, width head .84, interocular space .44, length pronotum .28, width pronotum .23, length scutellum .48, width scutellum .60, length corium 1.24, length clavus 1.04, length cuneus .56, width cuneus .40, length claval commissure .56, distance apex commissure-apex membrane 1.04, length metatibiae 1.20; length antennal segments 1—.32, 2—.72, 3—.46, 4—approximately .60; length labial segments 1—.38, 2—.40, 3—.08, 4—.10.

MALE GENITALIA: Figures 318–320.

FEMALE: Submacropterous, cuneus and membrane relatively shorter than in male; antennal segment 2 shorter than in male and of slightly smaller diameter, without row of erect hairs; posterior margin of pronotum not as strongly excavated as in male.

FEMALE GENITALIA: Figures 315–317.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Pretoria, Wonderboom, 3 Apr. 1968, J. A. & S. Slater, T. Schuh (Adults and nymphs on *Aloe* sp.) (SANC).

PARATYPES: 12 macropterous ♂♂, 10 submacropterous ♀♀, same data as holotype (SANC, JAS, RTS).

ADDITIONAL SPECIMENS: 3 ♂♂, 58 nymphs (in alcohol), same data as holotype (RTS).

This species is named for Mr. Samuel T. Slater.

See discussion under *A. australis*.

Ambonea Odhiambo

Ambonea Odhiambo, 1960b, pp. 393–400.

Ambonea can be characterized as follows: the parempodia apically are convergent and recurved; the head is short and broad and the posterior margin of the vertex finely carinate; the dorsum is covered with flattened decumbent sericeous hairs and reclining setiform hairs; and, the structure of the male genitalia is characteristic. The genus is most closely related to *Hypseloecus* Reuter from Europe, and somewhat less closely related to *Aloea*, *Parambonea*, and *Neoambonea* from Africa. *Ambonea* can be separated from *Neoambonea* because it lacks the punctures on the dorsum and from *Parambonea* because it has two types of pubescence on the dorsum. *Pseudambonea* has a similar facies to *Ambonea*, but is a member of the Orthotylini, based on the structure of the male and female genitalia.

MALE GENITALIA: Figures 321–326. Vesica similar in structure to *Aloea* and *Neoambonea*; phallosome somewhat L-shaped, structure complex; left clasper with long sensory processes, short body; right clasper lanceolate.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate with an evaginated posterior margin.

Ambonea currently contains four species from East and South Africa.

***Ambonea munroi*, new species**

Figures 86, 321–323

MACROPTEROUS MALE: Stout bodied; basic coloration red; anterior third of pronotum laterally, posterior margin of pronotum across mesoscutum, clavus narrowly along claval commissure, corium along medius, thoracic pleura, abdominal venter, and coxae (heavily) suffused with black; all coxae yellowish, mesocoxae and metacoxae suffused with red; vertex with rounded yellowish spots contiguous with mesial margins of eyes; tibiae light yellowish with bands of red formed by dark bases of tibial spines; tarsi light brown; antennal segments 3 and 4 yellowish (from paratype, segments 3 and 4 missing in holotype).

Dorsum smooth, dull; entire body densely covered with reclining, setiform hairs and decumbent, wooly sericeous hairs; pronotum at

about midpoint of lateral margin with a long, erect, slender spine; antennal segment 1 with some decumbent hairs and a few erect, dark spines, segments 2, 3, and 4 with short dense vestiture; femora with a few, very long, erect, fine hairs on ventral surfaces; tibiae with dark spines about as long as tibial diameter, arranged on tibiae in groups.

Head broad, declivous; eyes large, appearing almost substylate; vertex very steeply inclined, posterior margin finely carinate; frons distinctly transversely rugose; anterior margins of eyes sinuate, eyes occupying about three-fourths height of head; antennae inserted just above ventral margin of eyes; antennal segment 1 slightly enlarged, antennal segment 2 tapering slightly proximally, distal diameter about equal to diameter of segment 1, segments 3 and 4 about two-thirds diameter of segment 2 (from paratype); bucculae slightly expanded; gula obsolete; labium just surpassing metacoxae at trochanteral joint; pronotum with anterior margin finely carinate, upturned, lateral margins broadly convex, posterior margin nearly straight; mesoscutum and scutellum nearly flat; lateral corial margins weakly convex; cuneal incisure obsolete, fracture slightly angled anteromedially; cuneus and membrane strongly declivous, membrane with two cells, posterior margin of cells broadly rounded; abdomen just surpassing apex of cuneus; all tibiae with rows of tiny, closely-spaced spines; metatarsal segments 2 and 3 subequal in length, segment 1 about two-thirds length of segment 2 (from paratype); claws relatively short, evenly curved, broad at base; parempodia fleshy, convergent apically, recurved; pulvilli minute.

MEASUREMENTS: Total length 3.12, maximum width 1.36, length head .20, width head 1.08, interocular space .48, length pronotum .52, width pronotum 1.28, length scutellum .76, width scutellum .88, length corium 1.64, length clavus 1.44, length cuneus .64, width cuneus .40, length claval commissure .64, distance apex commissure-apex membrane approx. 1.20, length metatibia 1.60; length antennal segments 1—.24, 2—1.06, 3—?, 4—?; length labial segments 1—.44, 2—.46, 3—.32, 4—.40.

MALE GENITALIA: Figures 321–323.

MACROPTEROUS FEMALE: Very similar to macropterous male.

FEMALE GENITALIA: See generic discussion.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Cullinan area, Jan. 1966, H. K. Munro (Host plant—*Loranthus rubromarginatus*) (SANC).

PARATYPES: *Transvaal*—1 macropterous ♂, 2 macropterous ♀♀, same data as holotype; 2 macropterous ♀♀, Hartebeespoort Dam,

20.5.65 (Paliatseas); 2 macropterous ♂♂, Rustenburg, XI-8-1952 (Capener); 1 macropterous ♂, Rustenburg XII-10-1952 (Capener); 3 macropterous ♀♀, Rustenburg, 7-14 Nov. 1967 (Capener) (Adults on *Loranthus zeyheri*) (SANC, JAS, RTS).

This species is named for Dr. H. K. Munro, well known South African dipterist, who collected the holotype.

Ambonea munroi can be separated from *rustenburgensis* by its size and bright red coloration.

The hosts of this species are species of *Loranthus* spp. (Loranthaceae).

A female specimen from Kimberly, Cape Province (deposited in J. A. Slater Collection), is generally bright red like *munroi* but differs slightly in coloration and may represent a new species.

***Ambonea rustenburgensis*, new species**

Figures 87, 324-326

MACROPTEROUS MALE: Stout bodied; generally yellow brown, dorsum heavily suffused with darker brown; mesial two-thirds of cunus suffused with red; membrane smoky brown; head anteriorly and ventrally, antennae, propleuron, prosternum, procoxae, basalar plate, all tibiae and tarsi, metathoracic scent gland opening, and abdominal venter light yellow brown or yellow white; mesocoxae and metacoxae suffused with brown; all femora brown proximally, mottled mesially, and yellow brown distally; mesothoracic and metathoracic pleura and sterna brownish black.

Body surface texture and vestiture as in *munroi* except as follows: tibiae with semierect dark spines, without dark bases, of length slightly greater than tibial diameter.

Structure similar to *munroi* except as follows: head nearly vertical; antennal segment 2 cylindrical, about three-fourths diameter of segment 1 (segments 3 and 4 missing in holotype); labium almost reaching trochanteral joint of metacoxae; cuneal incisure deep, fracture at right angles to longitudinal axis of body; metatarsal segments 2 and 3 subequal in length, segment 1 about one-half length of segment 2.

MEASUREMENTS: Total length 3.80, maximum width 2.00, length head .12, width head 1.28, interocular space .64, length pronotum .48, width pronotum 1.52, length scutellum .88, width scutellum 1.12, length corium 1.88, length clavus 1.56, length cuneus .76, width cuneus .44, length claval commissure .60, distance apex commissure-apex membrane 1.60, length metatibia 1.92; length an-

tennal segments 1—.28, 2—1.24, 3—?, 4—?; length labial segments 1—.36, 2—.28, 3—.52, 4—.36.

MALE GENITALIA: Figures 324–326.

MACROPTEROUS FEMALE: Very similar to male.

FEMALE GENITALIA: See generic discussion.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Rustenburg, III-22-1953, A. L. Capener (SANC).

PARATYPES: *Transvaal*—1 macropterous ♂, 1 macropterous ♀, same data as holotype; 1 macropterous ♀, Rustenburg, XII-14-24-1961 (Capener) (JAS, RTS).

This species is named for the town of Rustenburg.

Ambonea rustenburgensis can be separated from all other described species in the genus by its nearly unicolorous metatibiae.

Neoambonea, new genus

MACROPTEROUS MALE: Stout bodied; entire dorsum rather weakly but distinctly punctured and finely transversely rugulose; pronotum polished, shining, remainder of dorsum dull; entire body covered with reclining, golden hairs about as long as diameter of antennal segment 2, and decumbent, somewhat flattened, wooly, sericeous hairs; antennal segment 1 with some inconspicuous, decumbent hairs; segments 2, 3, and 4 with dense, reclining, light vestiture about as long as diameter of antennal segment 3; femora, tibiae, and tarsi with reclining hairs, femora also with a few, very long, fine hairs on ventral surfaces.

Head broad, strongly flattened anteroposteriorly; vertex nearly vertical, posterior margin finely carinate, weakly concave; eyes moderately large, occupying about two-thirds of height of head; antennae inserted just at level of ventral margins of eyes, fossae only slightly removed from anterior margins of eyes, segment 1 very slightly enlarged, segment 2 cylindrical, slightly smaller in diameter than segment 1, segments 3 and 4 about two-thirds diameter of segment 2; clypeus large, somewhat flattened; genae about two-thirds height of eye; bucculae only slightly expanded; gula short, nearly vertical; labium short; pronotum with anterior margin carinate, upturned; pronotum slightly elevated posteriorly; mesoscutum narrowly exposed; scutellum convex; lateral corial margins irregularly convex; cuneal incisure very deep; membrane with two cells, large cell short, posterior margin very broadly rounded; cuneus and membrane strongly declivous; legs relatively short; femora narrow; all tibiae with rows of tiny, closely-spaced spines and semierect spines about as long as tibial diameter; tarsal claws moderately long, broad at base, evenly

curved; parempodia fleshy, convergent apically, recurved; pulvilli minute.

MALE GENITALIA: Figures 329–331. Very similar in structure to *Aloea*.

MACROPTEROUS FEMALE: Very similar to male.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate with posterior margin strongly evaginated.

TYPE SPECIES: *Neoambonea cynanchi*, new species.

This genus is named for its similarity to *Ambonea*.

Neoambonea can be recognized by the fleshy, apically convergent, recurved parempodia, black coloration with light antennae and tibiae, broad vertical head, and distinctly punctured dorsum with reclining setiform hairs in addition to decumbent, wooly, sericeous hairs. *Parambonea*, the most closely related genus, has the dorsum with only transverse rugosities and reclining setiform hairs and has black antennae and tibiae.

***Neoambonea cynanchi*, new species**

Figures 88, 329–331

MACROPTEROUS MALE: General coloration black or brownish black; antennae (segment 2 darkening distally, segments 3 and 4 light brown), all femora distally, all tibiae and tarsi, and labial segments 1, 2, and 3 yellowish; ring on proximal third of antennal segment 1 red; vertex with two rounded reddish markings contiguous with mesial margins of eyes.

Frons weakly convex; labium slightly surpassing procoxae at trochanteral joint; calli indistinct, widely separated medially; pronotum with anterior margin evenly convexly rounded, lateral margins very weakly convex, posterior margin sinuate, forming a shallow inverted "V"; cuneal fracture perpendicular to longitudinal axis of body; lateral margin of cuneus convex; abdomen reaching to about middle of cuneus; metatarsal segments all subequal in length.

MEASUREMENTS: Total length 3.28, maximum width 1.80, length head .12, width head .84, interocular space .44, length pronotum .44, width pronotum 1.20, length scutellum .64, width scutellum .64, length corium 1.52, length clavus 1.32, length cuneus .60, width cuneus .56, length claval commissure .68, distance apex commissure-apex membrane 1.36, length metatibia 1.40; length antennal segments 1—.30, 2—.90, 3—.50, 4—approximately .70; length labial segments 1—.22, 2—.24, 3—.14, 4—.06.

MALE GENITALIA: Figures 329–331.

MACROPTEROUS FEMALE: Very similar to male.

FEMALE GENITALIA: Posterior wall a simple sclerotized plate with posterior margin strongly evaginated.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, 20 mi. E. Machadodorp, Schoemanskloof, 4300 ft. elevation, 22 Mar. 1968, T. Schuh, J. A. & S. Slater, M. Sweet (Adults and nymphs on *Cynanchum africanum* R.Br.) (SANC).

PARATYPES: 4 macropterous ♂♂, 6 macropterous ♀♀, same data as holotype. *Cape Province*—4 macropterous ♂♂, 9 macropterous ♀♀, Storms River Mouth, 18.II.66 (Capener). *Natal*—1 macropterous ♀, Umkomaas, July 1948 (Capener) (SANC, JAS, RTS).

This species is named for the host genus, *Cynanchum*.

Neoambonea cynanchi is very closely related to *Neoambonea slateri*. The larger size and prominent eyes that are not closely appressed to the anterolateral angles of the pronotum are the most useful characters for separating the two species; the latter species is smaller and has the eyes contiguous with the anterolateral angles of the pronotum. *N. slateri* also lacks the red stripe on antennal segment 1 that is present in *cynanchi*.

The host of this species is *Cynanchum africanum* R. Br. (Asclepiadaceae).

***Neoambonea slateri*, new species**

Figure 89

MACROPTEROUS MALE: Coloration, surface texture and vestiture very similar to *Neoambonea cynanchi*, but antennal segment 1 without red stripe.

Structurally very similar to *cynanchi*; smaller (see measurements); head concave posteriorly, eyes contiguous with anterolateral margins of pronotum; labium nearly reaching mesocoxae at trochanteral joint.

MEASUREMENTS: Total length approx. 2.40, maximum width 1.44, length head .08, width head .88, interocular space .48, length pronotum .48, width pronotum 1.12, length scutellum .48, width scutellum .64, length corium 1.28, length clavus 1.08, length cuneus .48, width cuneus .44, length claval commissure .56, distance apex commissure-apex membrane .88, length metatibia 1.32; length antennal segments 1—.19, 2—.80, 3—.44, 4—.52; length labial segments 1—.24, 2, 3, and 4—.52.

MALE GENITALIA: Not dissected.

Female unknown.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Cape Province*,

Keurboomsrivier, 12 Feb. 1968, T. Schuh, J. A. & S. Slater, M. Sweet (Adults on *Cynanchum obtusifolium* L. F.) (SANC).

PARATYPE: 1 macropterous ♂, same data as holotype (RTS).

This species is named for Dr. J. A. Slater of the University of Connecticut.

See discussion under *N. cynanchi*.

The host of this species is *Cynanchum obtusifolium* L.F. (Asclepiadaceae).

Parambonea, new genus

MACROPTEROUS MALE: Stout bodied; head, pronotum, and scutellum polished, shining; pronotum and scutellum transversely finely rugose and with the appearance of faint punctations; hemelytra dull, very faintly transversely rugose; venter dull; entire body with moderately long, reclining, golden hairs; antennae with fine, decumbent, light pubescence, segments 2 and 3 (4 missing in holotype) with a few semierect, fine, light hairs about the length of diameter of antennal segment 2, segment 1 with a fine, light spine on interior surface; femora, tibiae, and tarsi with reclining light hairs; femora with a few very long, erect, fine hairs on ventral surfaces; anterolateral angles of pronotum with a light, very fine, long, erect spine.

Head broad, extremely flat; vertex nearly vertical, posterior margin very finely carinate; eyes large, extending posteriorly around anterolateral angles of pronotum; frons weakly convex; eyes occupying about one-half height of head; antennae inserted just below ventral margin of eyes, fossae slightly removed from eyes; antennal segment 1 slightly enlarged, segment 2 tapering somewhat proximally, about three-fourths diameter of segment 1, segment 3 cylindrical, about equal in diameter to proximal diameter of segment 2; genae very high; apex of clypeus directed posteroventrally, clypeus somewhat flattened; bucculae slightly enlarged, gula obsolete; pronotum broad, flattened, very slightly inclined posteriorly, with carinate, upturned, anterior margin; calli indistinct, widely separated medially, pronotum depressed on either side of middle behind calli; mesoscutum narrowly exposed, scutellum flat; lateral corial margins weakly convex, cuneal incisure deep, fracture very slightly angled anteromedially; lateral margin of cuneus convex; cuneus and membrane strongly deflexed; membrane with two cells, posterior margin of cells broadly rounded; legs relatively short; femora not noticeably enlarged; tibiae with reclining light spines about as long as tibial diameter, without conspicuous semierect spines; all tibiae with rows of tiny, closely-spaced spines; tarsal claws moderately long, broad

basally, evenly curved; parempodia fleshy, convergent apically, recurved; pulvilli minute.

MALE GENITALIA: Figures 327, 328. Vesica somewhat sickle-shaped, flattened, gonopore undeveloped; phallosome straight, similar in structure to *Pilophorus*, opening apical; left clasper very similar to that of *Neoambonea* and *Aloea*; right clasper lanceolate.

MACROPTEROUS FEMALE: Very similar to male.

FEMALE GENITALIA: Not dissected.

TYPE SPECIES: *Parambonea transvaalensis*, new species.

This genus is named for its similarity to *Ambonea*.

Parambonea is very closely related to *Neoambonea*, but differs from it by lacking the punctations on the dorsum, having completely black antennae and legs, and having the vesica and the phallosome structurally distinct (see also discussion under *Neoambonea*).

***Parambonea transvaalensis*, new species**

Figures 90, 327, 328

MACROPTEROUS MALE: Entirely black, membrane smoky brown black; vertex with rounded, light brown spot on either side, removed from mesial margin of eyes and posterior margin of vertex by distance equal to about diameter of antennal segment 2.

Posterior margin of vertex nearly straight; labium reaching between procoxae and mesocoxae; pronotum with anterior and lateral margins nearly straight, posterior margin distinctly sinuate; abdomen reaching almost to apex of cuneus; metatarsal segments 1 and 2 subequal in length, segment 3 slightly longer than segment 2.

MEASUREMENTS: Total length approx. 2.80, maximum width 1.56, length head .08, width head .88, interocular space .52, length pronotum .44, width pronotum 1.24, length scutellum .52, width scutellum .64, length corium 1.36, length clavus 1.12, length cuneus .56, width cuneus .52, length claval commissure .60, distance apex commissure-apex membrane 1.36, length metatibia 1.36; length antennal segments 1—.22, 2—.74, 3—.46, 4—?; length labial segments 1—.26, 2, 3, and 4—.48.

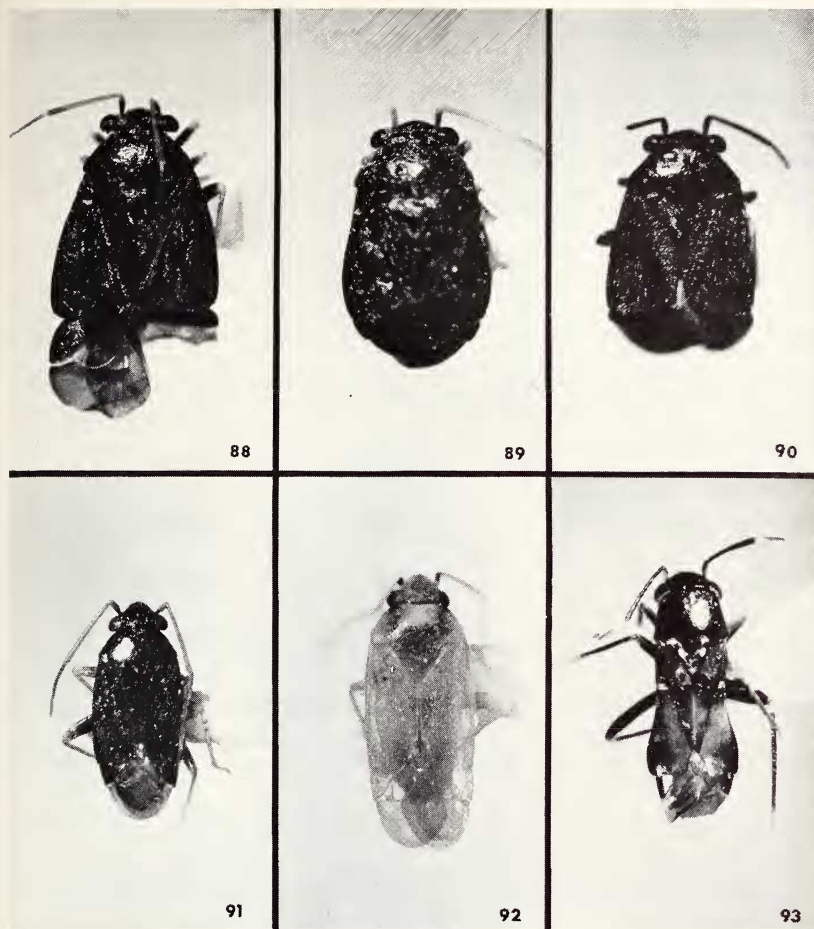
MALE GENITALIA: Figures 327, 328.

MACROPTEROUS FEMALE: Very similar to male.

FEMALE GENITALIA: Not dissected.

HOLOTYPE: Macropterous ♂, SOUTH AFRICA: *Transvaal*, Nat. Botanical Gardens, Pretoria, 22 Nov. 1967, J. A. & S. Slater, T. Schuh (SANC).

ADDITIONAL SPECIMENS: *Transvaal*—1 macropterous ♂, Foun-



FIGS. 88-93. Pilophorini. Fig. 88. *Neoambonea cynanchi*, male, holotype. Fig. 89. *Neoambonea slateri*, male, holotype. Fig. 90. *Parambonea transvaalensis*, male, holotype. Fig. 91. *Paramixia australis*, male, holotype. Fig. 92. *Paramixia suturalis*, female (St. Lucia Estuary, Natal). Fig. 93. *Pilophorus pilosus*, male (Port Shepstone, Natal).

tains, Pretoria, XII-20-1950 (Capener); 2 macropterous ♀♀, Kloofzicht, II-13-1952 (Capener); 1 macropterous ♀, Pretoria, 3.2.34 (Munro); 1 macropterous ♀, Pretoria, 17.1.1932 (van Son) (TM, BM[NH], JAS, RTS).

This species is named for its occurrence in the Transvaal.
See generic discussion.

The single additional male specimen from Fountains, Pretoria, resembles the holotype very closely, especially in the form of the genitalia, but it is slightly smaller and may be teneral. The four female specimens from the Pretoria area all appear to be conspecific with one another, but are smaller than the males examined and therefore may represent another species.

Paramixia Reuter

Paramixia Reuter, 1900, p. 264—Carvalho, 1958a, p. 86.—Wagner, 1970a, pp. 1–3.

Troitskiella Poppius, 1914a, pp. 81–82. **New Synonymy.**

Schroederiella Poppius, 1914a, p. 88. (Synonymized by: Wagner, 1970a, p. 3).

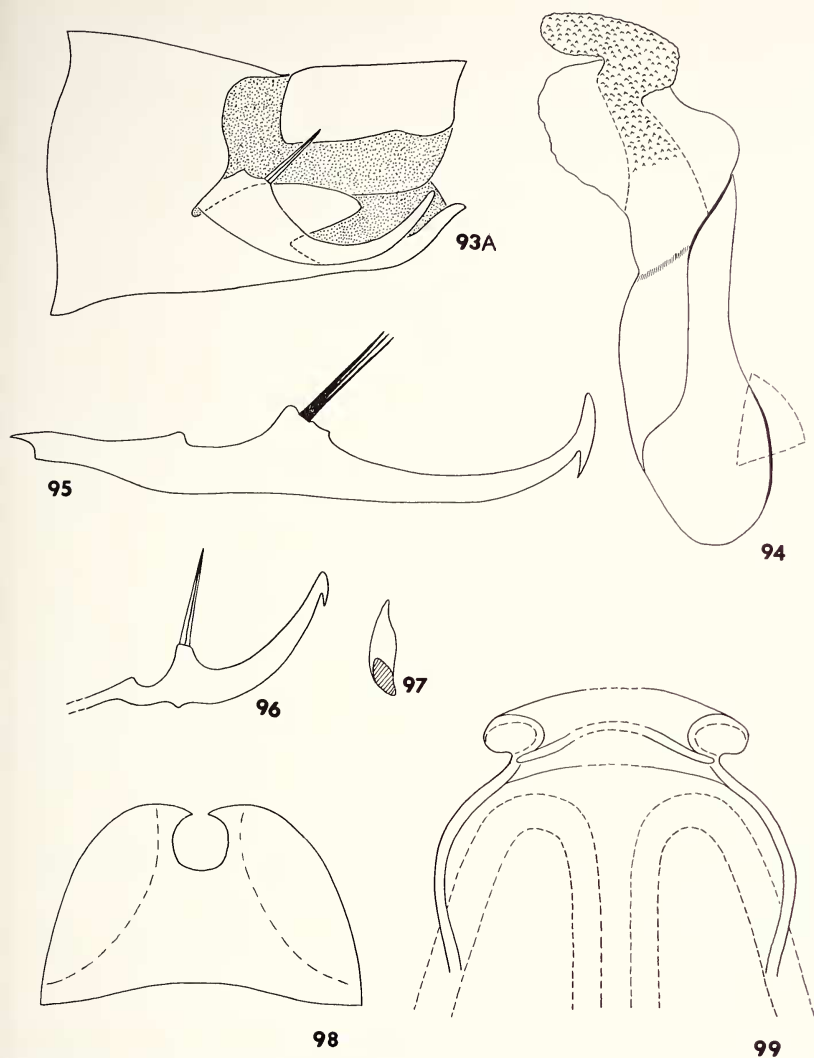
Cephalocapsus Poppius, 1914a, pp. 88–91. **New Synonymy.**

Orthotylellus Knight, 1935, p. 207. **New Synonymy.**

Amixia Carvalho, 1952a, p. 75 (in part).—Carvalho, 1960, p. 194 (in part).

Reuter (1900) described *Paramixia* with a single included species, *P. suturalis* Reuter, from the Nile Valley; later in his catalog (Reuter, 1910a) he placed the genus in the Division Phylaria. Poppius (1914a) did not include *Paramixia* in his treatment of the Ethiopian Miridae. Carvalho (1952a; 1958a) placed *Paramixia* in the Phylinae. Lindberg (1958), in recording *Paramixia suturalis* from the Cape Verde Islands, noted that the structure of the parempodia and the claws should place the genus in the subfamily Orthotylinae. His figures indicated, however, that the male genitalia are of the Phylinae-type. Wagner (1970a) discussed the relationships of the genus.

Poppius (1914a) described *Troitskiella* (with one included species, *T. minuta* Poppius, from Bukoba, Tanzania), *Cephalocapsus* (with the type species *C. clypealis* Poppius, from Malawi and three additional species from Africa and Madagascar), and *Schroederiella* (with a single included species, *S. nigra* Poppius from Mt. Kilimanjaro). He placed *Troitskiella* in the Heterotomaria and *Cephalocapsus* and *Schroederiella* in the Phylinae. Poppius indicated in his key that the last two genera were related by virtue of the "arolia" being free, extending to the apex of the claws, and converging apically. Examination of the type specimens of *Troitskiella minuta*, *Cephalocapsus clypealis*, and *Schroederiella nigra* indicates that in fact the



FIGS. 93A-99. Nichomachini male and female genitalia. Fig. 93A. Lateral view of male genital capsule, *Pseudonichomachus mimeticus*. Fig. 94. Lateral view of phallus, *idem*. Fig. 95. Left clasper, *idem*. Fig. 96. Left clasper, *Nichomachus sweeti*. Fig. 97. Right clasper, *idem*. Fig. 98. Posterior wall, *idem*. Fig. 99. Sclerotized rings, *idem*.

"arolia" (parempodia) of all of them are apically convergent and recurved and arise from between the claws and not from the basal tooth of the claw as Poppius apparently presumed in the case of *Cephalocapsus* and *Schroederiella*. Further examination reveals that *Cephalocapsus* Poppius, and *Troitskiella* Poppius are synonymous with *Paramixia* Reuter, on the basis of the structure of the claws, male genitalia, and external morphology. Wagner (1970a) synonymized *Schroederiella* with *Paramixia* and discussed the close relationship of *Cephalocapsus* and *Paramixia*.

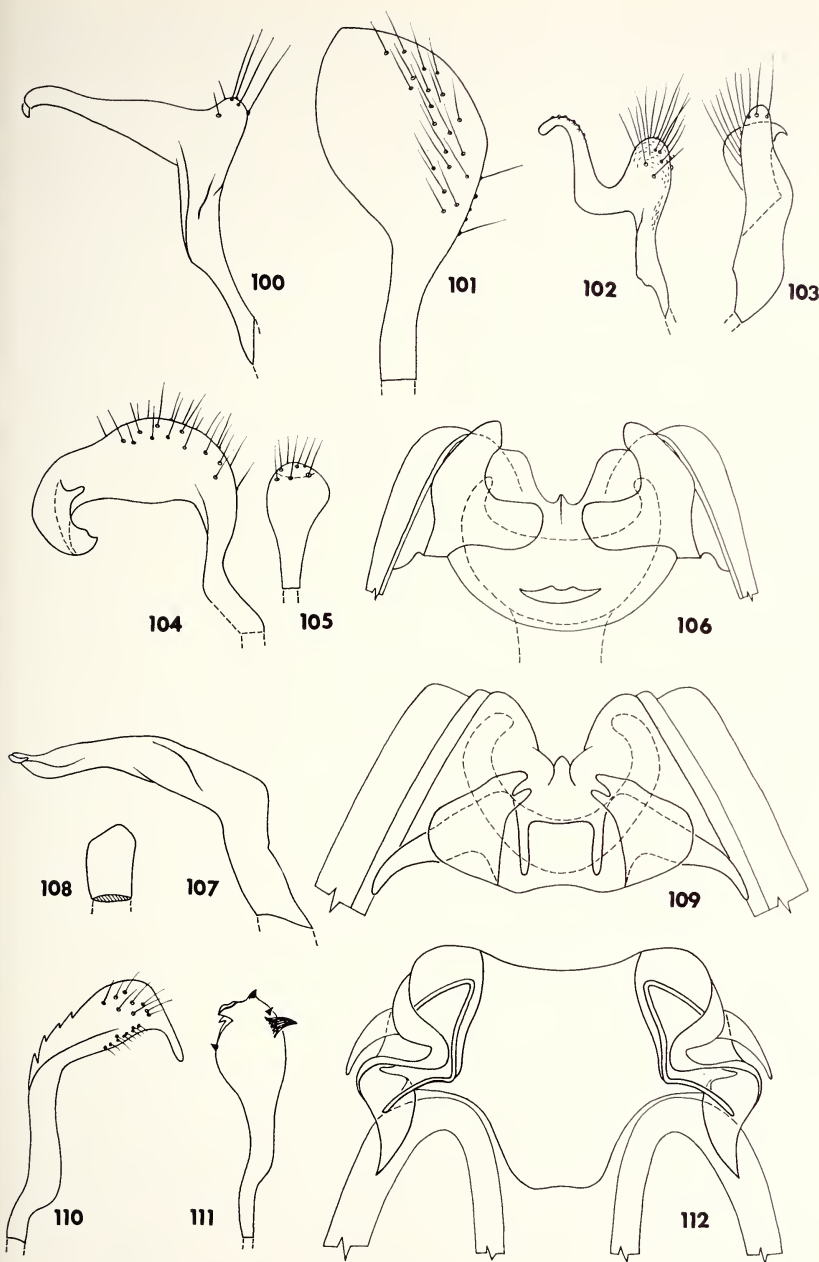
Carvalho (1952a) synonymized *Troitskiella* with *Amixia* Reuter. As noted above, *Troitskiella* is a synonym of *Paramixia*; therefore if Carvalho was correct in synonymizing *Troitskiella* with *Amixia*, *Paramixia* would also be a synonym of *Amixia*. Wagner (1957a) studied *Amixia*, and showed that it has hair-like parempodia (as opposed to what is indicated in Reuter's original description) and also an S-shaped phallus unlike that of *Paramixia*, and that in fact *Amixia* is a generic synonym of *Orthonotus* Stephens. Therefore, *Troitskiella* is not a synonym of *Orthonotus*, but of *Paramixia*. Wagner (1957a) did not examine *Troitskiella*.

Knight (1935) described *Orthotylellus* Knight from Samoa, with a single included species, *O. samoanus* Knight. Usinger (1946) described three additional species in *Orthotylellus* from Guam, *O. rufescens* Usinger, *O. pallescens* Usinger, and *O. brunnescens* Usinger. Carvalho (1948) described *Rhinocloa carmelitana* Carvalho, from Brazil, which he later transferred to *Orthotylellus* (Carvalho, 1955b). Carvalho (1956b) has illustrated the male genitalia of the Pacific species of *Orthotylellus* and Maldonado (1969) those of *O. carmelitanus*. Comparison of these genitalic illustrations with the male genitalia of *Paramixia* clearly indicates that *Orthotylellus* Knight is synonymous with *Paramixia* Reuter.

China (1938) described three new species of *Cephalocapsus*

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FIGS. 100–112. Halticini and Orthotylini male and female genitalia. Fig. 100. Left clasper, *Namaquacapsus melanostethoides*. Fig. 101. Right clasper, *idem*. Fig. 102. Left clasper, *Cyrtorhinus melanops*. Fig. 103. Right clasper, *idem*. Fig. 104. Left clasper, *Pseudambonea capeneri*. Fig. 105. Right clasper, *idem*. Fig. 106. Posterior wall, *idem*. Fig. 107. Left clasper, *Pseudoloxops transvaalensis*. Fig. 108. Right clasper, *idem*. Fig. 109. Posterior wall, *Pseudopilophorus capeneri*. Fig. 110. Left clasper, *idem*. Fig. 111. Right clasper, *idem*. Fig. 112. Sclerotized rings, *idem*.



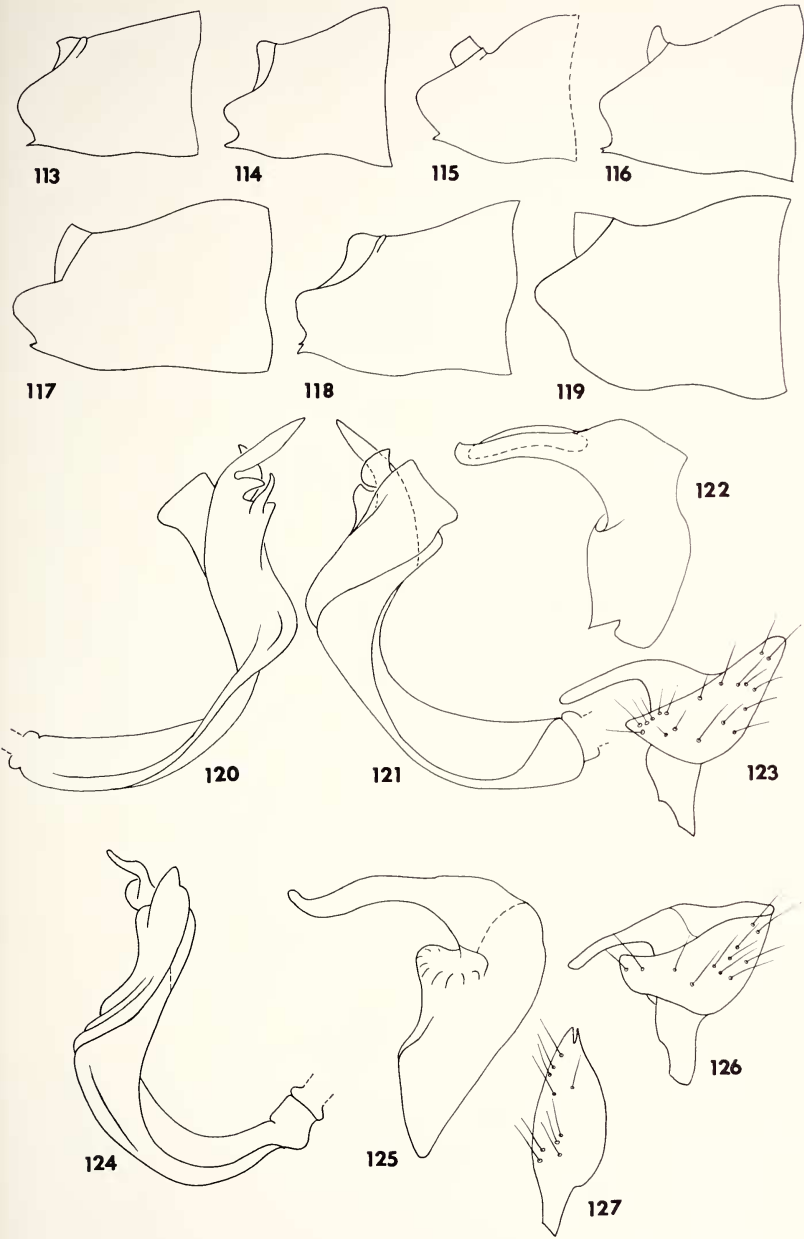
from Madeira Island, moved a fourth species to that genus, and discussed the difficulty of placing the genus in a subfamily on the basis of the pretarsal structures. China stated that to his knowledge *Cephalocapsus* and *Schroederiella* were the only plagiognathine (Phylinae) genera with "free arolia". This assumption by China was based on the work of Poppius who used the term "arolium" in a strict sense to mean a fleshy pad. Although China (1938) interpreted the structure of the claws of his specimens of "*Cephalocapsus*" correctly, he apparently misinterpreted Poppius' conception of the "arolia" in *Cephalocapsus*. I interpret Poppius' (1914a) use of the term "arolia" in the case of *Cephalocapsus* and *Schroederiella* to refer to the pulvilli and not the parempodia. The inclusion of *Cephalocapsus* and *Schroederiella* in the Phylinae by Poppius (1914a) was based on his misinterpretation of the structure of the claw and parempodia, although he interpreted it correctly in *Troitskiella*. Kerzhner and Yaczewski (1964) noted that there has been much confusion regarding these structures and that the pseudarolia (pulvilli) were called "arolia" in almost all [European] literature until 1955.

Wagner (1961) reviewed and revised the species which China (1938) placed in *Cephalocapsus* and created a new genus, *Chinacapsus* Wagner, to receive them. China (1938) in his original work did not examine the male genitalia. Wagner (1961) illustrated the vesica, claspers, and phallosome for most species concerned; comparison of the vesica in particular, indicates that *Chinacapsus* is not congeneric with *Paramixia*.

Wagner (1970a) described the parempodia of *Paramixia* as being of the same structure as those of *Chinacapsus* (see Wagner, 1961). Careful examination of large numbers of specimens of *Paramixia* from South Africa indicates that the parempodia are apically convergent and recurved, and not rod-like and weakly convergent apically as are those of *Chinacapsus*. The vesica in *Paramixia* is also

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FIGS. 113–127. Hallodapini, *Acrorrhinium* male genitalia. Fig. 113. Lateral view of male genital capsule, *A. brincki*. Fig. 114. *idem*, *A. drakensbergensis*. Fig. 115. *idem*, *A. oudtshoornensis*. Fig. 116. *idem*, *A. capensis*. Fig. 117. *idem*, *A. monticola*. Fig. 118. *idem*, *A. muntingi*. Fig. 119. *idem*, *A. incrassata*. Fig. 120. Lateral view of vesica, *A. brincki*. Fig. 121. Obverse view of vesica, *idem*. Fig. 122. Phallosome, *idem*. Fig. 123. Left clasper, *idem*. Fig. 124. Lateral view of vesica, *A. drakensbergensis*. Fig. 125. Phallosome, *idem*. Fig. 126. Left clasper, *idem*. Fig. 127. Right clasper, *idem*.



unlike that of *Chinacapsus*. The vesica of the latter genus resembles the form found in *Sthenarus* and related genera, whereas in *Paramixia* the structure of the vesica is similar to what is found in the Pilophorini. Based on the structure of the parempodia and vesica I am placing *Paramixia* in the Pilophorini.

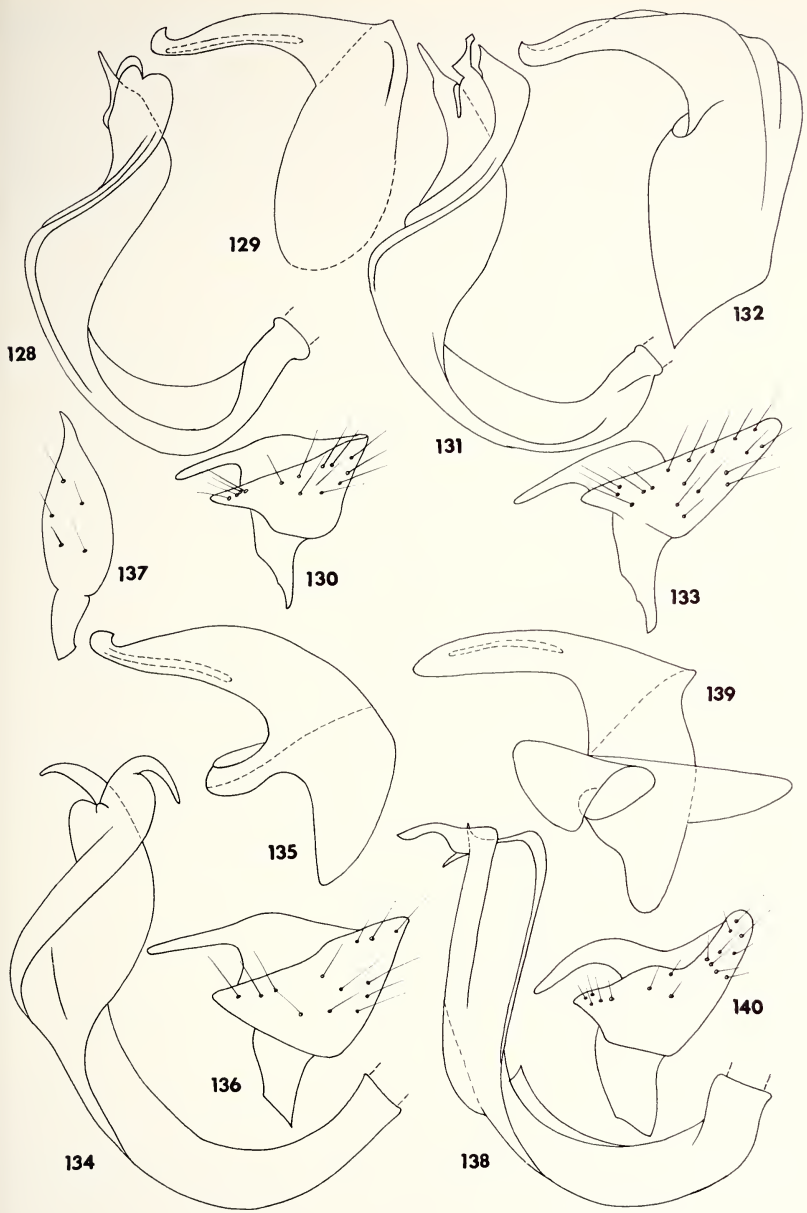
Paramixia can be characterized by its relatively small size, fleshy, recurved, convergent parempodia, declivous but not vertical head with a finely carinate posterior margin that slightly overlaps the anterior margin of the pronotum, shining, decumbent, dorsal pubescence (both *P. suturalis* and *P. australis* have in addition some flattened, decumbent, sericeous hairs), sexual dimorphism of antennal segment 2 (length about one-fourth greater than width of head across eyes in male and about equal to width of head across eyes in female), and the structure of the male genitalia, in which the vesica is a simple sclerotized tube curved into almost a complete coil (Figs. 332, 335), the phallosheca is L-shaped (Fig. 333), the left clasper is strongly flattened laterally (rather than anteroposteriorly as in most Pilophorini) (Fig. 334), and the right clasper is flat and lanceolate. The posterior wall of the female is a simple sclerotized plate and does not show the conspicuous evagination of the posterior margin found in all other members of the Pilophorini.

The great range of color variation encompassed in extensive collections of *Paramixia* from South Africa (see species discussions) gives some idea of the possible problems in the taxonomy of the genus. Before a definitive discussion of the species can be undertaken more extensive field work will have to be done. The male genitalia, however, do appear to be extremely stable from species to species, as for example in *suturalis* and *australis*.

The vesica of the holotype of *Paramixia nigra* (Poppius) is illustrated in Figure 336. A female specimen, probably representing a new species near *nigra*, with the data "Abachaus, Otjivarongo, N"

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FIGS. 128-140. Hallodapini, *Acrorrhinium* male genitalia. Fig. 128. Lateral view of vesica, *A. oudtshoornensis*. Fig. 129. Phallosheca, *idem*. Fig. 130. Left clasper, *idem*. Fig. 131. Lateral view of vesica, *A. capensis*. Fig. 132. Phallosheca, *idem*. Fig. 133. Left clasper, *idem*. Fig. 134. Lateral view of vesica, *A. monticola*. Fig. 135. Phallosheca, *idem*. Fig. 136. Left clasper, *idem*. Fig. 137. Right clasper, *idem*. Fig. 138. Lateral view of vesica, *A. incrassata*. Fig. 139. Phallosheca, *idem*. Fig. 140. Left clasper, *idem*.



South-west Africa, XII.1949, G. Hobohm," is in the Transvaal Museum. This specimen is black with all of the appendages light in color.

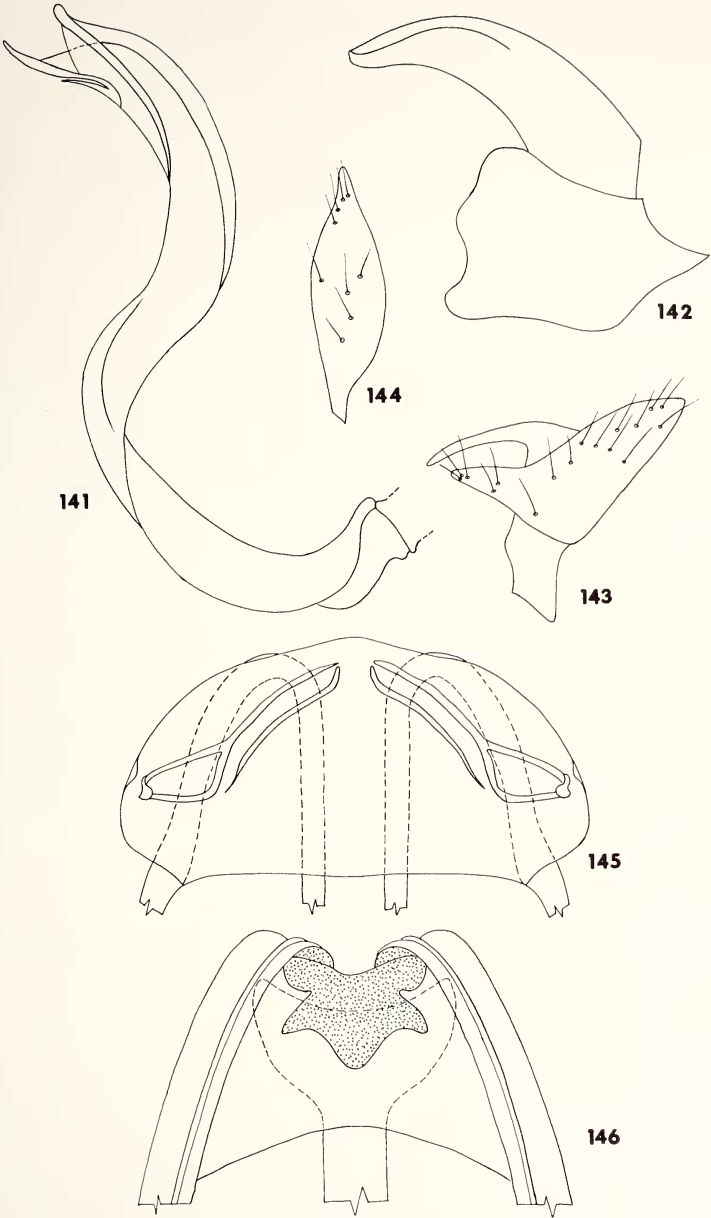
Paramixia is restricted to the Cyperaceae and Juncaceae in South Africa. Lindberg (1958) also cites records on Gramineae from the Cape Verde Islands. Usinger (1946) recorded species from Guam on *Rhynchospora corymbosa* and *Scleria margaritifera*; Maldonado (1969) recorded *carmelitanus* on *Cyperus rotundus* and *Cajanus cajan* in Puerto Rico.

List of species of *Paramixia*

- australis*, new species. South Africa: Natal, Transvaal, Cape Province
bergrothi Poppius (*Cephalocapsus*), 1914a, p. 90. **New Combination.** Madagascar.
brunnescens Usinger (*Orthotylellus*), 1946, pp. 81–82. **New Combination.** Guam.
carmelitanus Carvalho (*Rhinocloa*), 1948, p. 8. **New Combination.** Tropical America.
clypealis Poppius (*Cephalocapsus*), 1914a, pp. 90–91. **New Combination.** Malawi.
femoralis Poppius (*Cephalocapsus*), 1914a, pp. 89–90. **New Combination.** Malawi.
howanus Poppius (*Cephalocapsus*), 1914a, p. 89. **New Combination.** Madagascar.
minuta* Poppius (*Troitskiella*), see *Paramixia suturalis* Reuter **New Synonymy.
nigra Poppius (*Schroederiella*), 1914a, p. 88. Kilimanjaro.
pallescens Usinger (*Orthotylellus*), 1946, pp. 80–81. **New Combination.** Guam.
rufescens Usinger (*Orthotylellus*), 1946, pp. 79–80. **New Combination.** Guam.
samoanus Knight (*Orthotylellus*), 1935, p. 207. **New Combination.** Samoa.
suturalis Reuter (*Paramixia*), 1900, p. 264. Southern Mediterranean; Africa.

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FIGS. 141–146. Hallodapini, *Acrorrhinium* male and female genitalia. Fig. 141. Lateral view of vesica, *A. muntingi*. Fig. 142. Phallosheca, *idem*. Fig. 143. Left clasper, *idem*. Fig. 144. Right clasper, *idem*. Fig. 145. Sclerotized rings, *A. drakensbergensis*. Fig. 146. Posterior wall, *idem*.



Paramixia australis, new species

Figures 91, 332-334

Sthenarus basalis Carvalho, Dutra, and Becker, 1960 (*nec* Poppius), pp. 452-453.

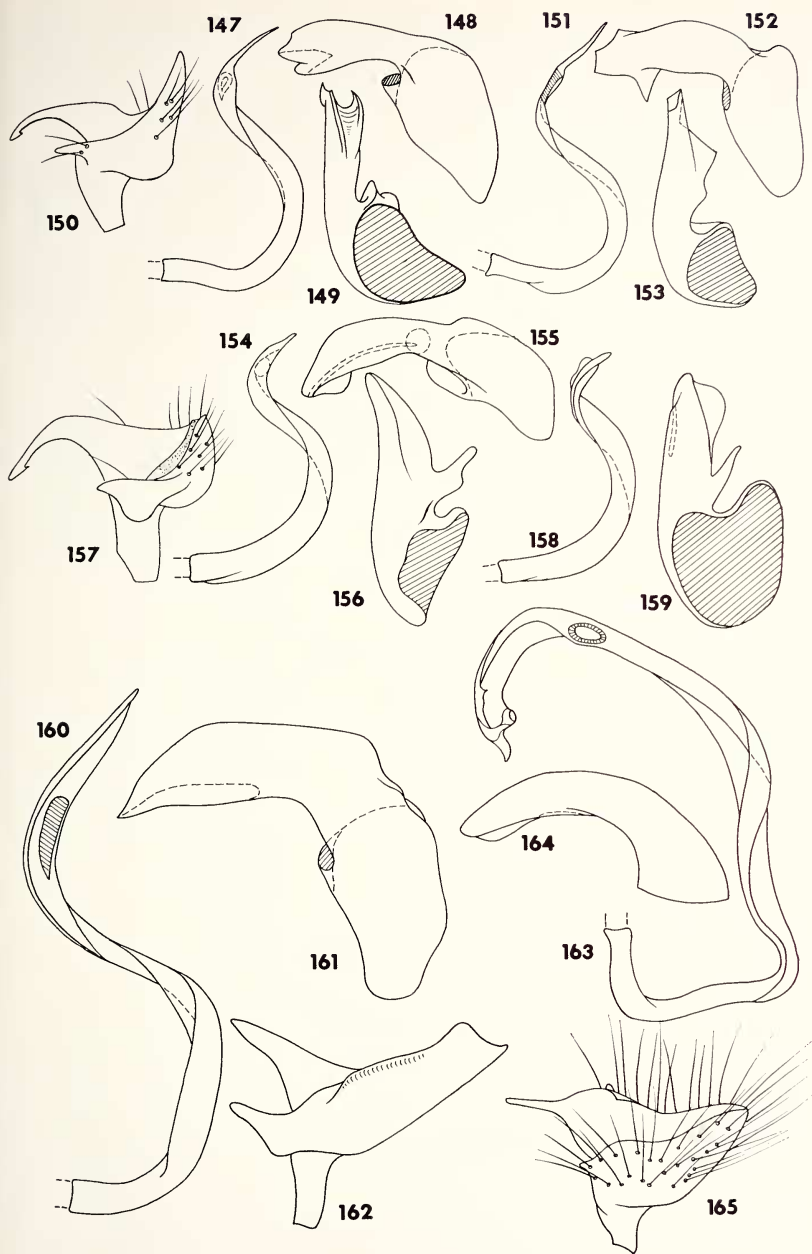
MACROPTEROUS MALE: Basic coloration black; distal four-fifths of antennal segment 1, antennal segment 2, distal third of labial segment 1, ventral margins of bucculae, ventral margins of prothoracic pleuron, posterior margin of mesosternum, all coxae distally, all trochanters, distal fifth of all femora, all tibiae, all tarsal segments 1 and 2, and dorsal margin of left clasper tan; tibial spines with black bases forming narrow bands; veins of membrane reddish.

Body and appendages polished, shining; dorsum faintly transversely rugose; coxae mostly pruinose; dorsum and abdominal venter with reclining golden hairs; dorsum and thoracic pleura with decumbent, wooly, sericeous hairs; antennal segment 1 with a fine spine on interior surface, segments 2, 3, and 4 with reclining, short, dull pubescence; genae below eyes with several long erect hairs; femora with short decumbent hairs and a few long erect hairs, particularly on ventral surfaces.

Head declivous, roughly triangular in dorsal view; clypeus flattened; eyes rather large, protuberant, contiguous with anterior margin of pronotum; vertex nearly as wide as anterior margin of pronotum, posterior margin straight, finely carinate; vertex and frons weakly convex; antennae inserted just above ventral margins of eyes; antennal segment 1 slightly enlarged, segment 2 cylindrical, about equal to diameter of segment 1, segments 3 and 4 about two-thirds diameter of segment 2; labium just surpassing metacoxae at

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FIGS. 147-165. Hallodapini male genitalia. Fig. 147. Lateral view of vesica, *Carinogulus transvaalensis*. Fig. 148. Lateral view of phallosheca, *idem*. Fig. 149. Ventral view of phallosheca, *idem*. Fig. 150. Left clasper, *idem*. Fig. 151. Lateral view of vesica, *Carinogulus hobohmi*. Fig. 152. Lateral view of phallosheca, *idem*. Fig. 153. Ventral view of phallosheca, *idem*. Fig. 154. Lateral view of vesica, *Carinogulus varii*. Fig. 155. Lateral view of phallosheca, *idem*. Fig. 156. Ventral view of phallosheca, *idem*. Fig. 157. Left clasper, *idem*. Fig. 158. Lateral view of vesica, *Carinogulus kochi*. Fig. 159. Ventral view of phallosheca, *idem*. Fig. 160. Lateral view of vesica, *Formicopsella regneri*. Fig. 161. Phallosheca, *idem*. Fig. 162. Left clasper, *idem*. Fig. 163. Lateral view of vesica, *Hallodapus albofasciatus*. Fig. 164. Phallosheca, *idem*. Fig. 165. Left clasper, *idem*.



trochanteral joint; pronotum with anterior margin nearly straight, lateral margins convexly rounded anteriorly, nearly straight on posterior three-fourths, posterior margin nearly straight across scutellum, evenly rounded laterally; pronotum slightly convex, lateral margin one-third distance posteriorly with a long, erect, slender spine; scutellum weakly convex; lateral corial margins convex; cuneal incisure shallow; cuneus and membrane declivous; membrane with two cells; legs rather short; all tibiae with rows of tiny, closely-spaced spines; tibial spines weak on protibiae, heavier and arranged in groups on mesotibiae and metatibiae; metatarsal segments 1, 2, and 3 subequal in length; parempodia fleshy, convergent apically, recurved; pulvilli minute.

MEASUREMENTS: Total length 2.28, maximum width 1.00, length head .20, width head .64, interocular space .32, length pronotum .32, width pronotum .84, length scutellum .40, width scutellum .52, length corium 1.04, length clavus .84, length cuneus .40, width cuneus .28, length claval commissure .44, distance apex commissure-apex membrane .96, length metatibia 1.24; length antennal segments 1—.20, 2—.80, 3—.44, 4—.42; length labial segments 1—.32, 2—.32, 3—.23, 4—.30.

MALE GENITALIA: Figures 332–334.

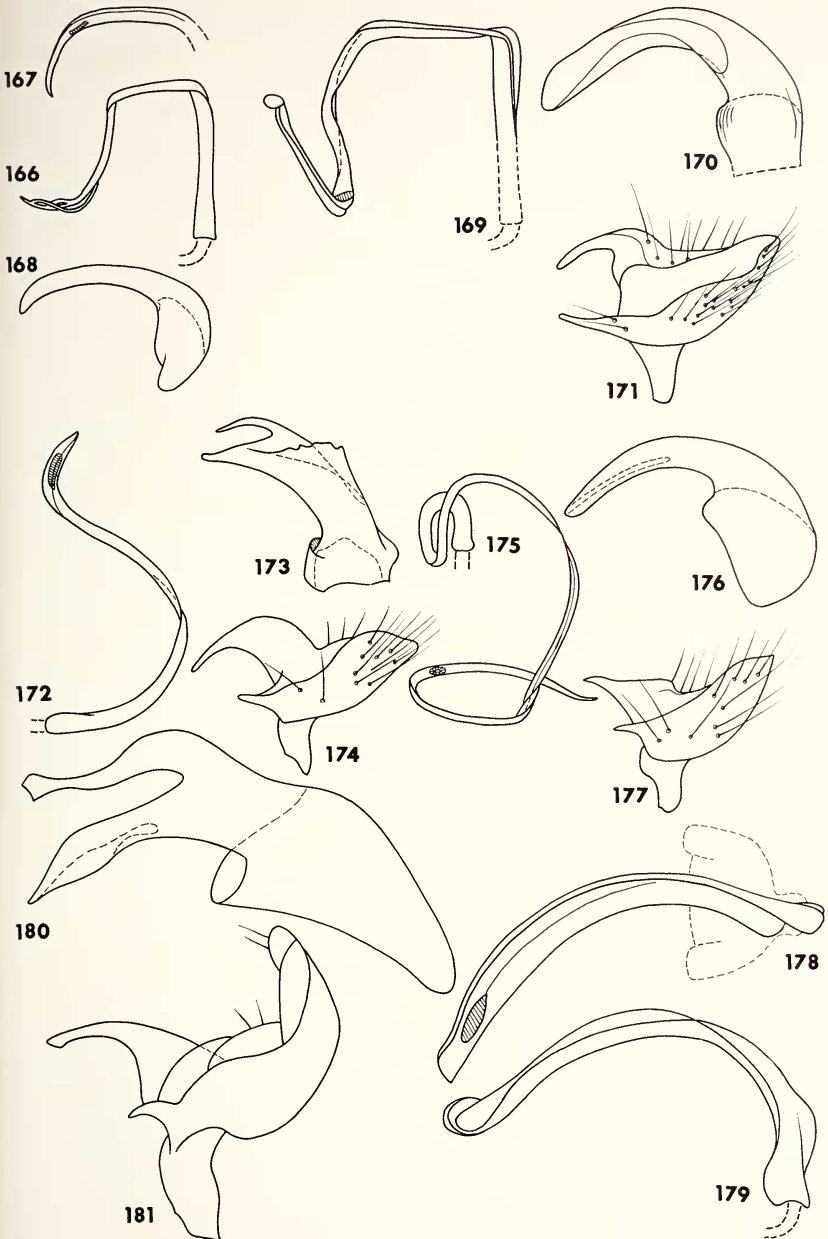
MACROPTEROUS FEMALE: Very similar to male; antennal proportions somewhat different (see generic discussion).

FEMALE GENITALIA: Posterior wall a simple sclerotized plate without evaginated posterior margin.

HOLOTYPE: Macropterus ♂, SOUTH AFRICA: *Cape Province*, Kirstenbosch Gardens, Cape Town, 29 Jan. 1968, J.A.&S. Slater, T. Schuh, M. Sweet (Adults and nymphs on *Cyperus rotundus* L.) (SANC).

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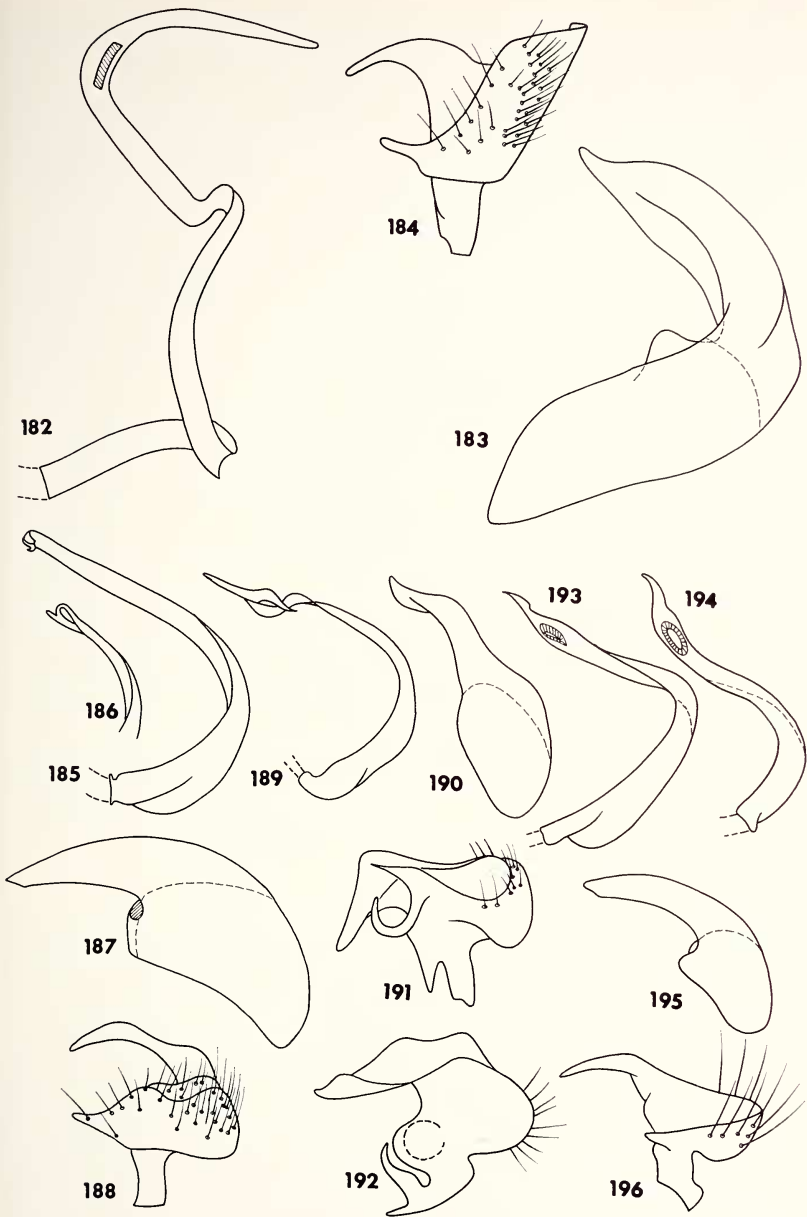
FIGS. 166–181. Hallodapini male genitalia. Fig. 166. Lateral view of vesica, *Hallodapus pseudosimilis*. Fig. 167. Apex of vesica, *idem*. Fig. 168. Phallotheca, *idem*. Fig. 169. Lateral view of vesica, *Hallodapus quadrimaculatus*. Fig. 170. Phallotheca, *idem*. Fig. 171. Left clasper, *idem*. Fig. 172. Lateral view of vesica, *Hallodapus similis*. Fig. 173. Phallotheca, *idem*. Fig. 174. Left clasper, *idem*. Fig. 175. Lateral view of vesica, *Hallodapus transvaalensis*. Fig. 176. Phallotheca, *idem*. Fig. 177. Left clasper, *idem*. Fig. 178. Dorsal view of vesica, *Pangania fasciatipennis*. Fig. 179. Lateral view of vesica, *idem*. Fig. 180. Phallotheca, *idem*. Fig. 181. Left clasper, *idem*.



PARATYPES: All specimens macropterous. *Cape Province*—7 ♂♂, 16 ♀♀, same data as holotype; 2 ♂♂, 6 ♀♀, Cape Peninsula, Noordhoek Beach (Adults on *Scirpus dioecus* Boeck.); 1 ♂, Brackenhill Falls, 6 mi. E. Knysna, 11 Feb. 1968; 1 ♀, Citrusdal, Oliphants River, 26 Jan. 1968; 1 ♀, Elands Height, 15 miles SW Mt. Fletcher, 9.III.51 (Brinck and Rudebeck); 2 ♀♀, just S. Outiniqua Pass Summit, S. of Oudtshoorn, 7 Feb. 1968; 1 ♂, Rondvlei near Knysna, 8 Feb. 1968; 1 ♂, 1 ♀, Schoemannspoort, 12 mi. N. Oudtshoorn, 7 Feb. 1968. *Natal*—1 ♂, 4 ♀♀, 20 mi. S. Durban, Illovo River mouth, 17 Apr. 1968; 1 ♂, 1 ♀, 28 mi. WSW Durban, Stony Hill, 17 Apr. 1968; 5 ♂♂, 1 ♀, Eshowe, 15 Nov. 1967; 1 ♂, *idem*, at light; 2 ♂♂, 1 ♀, Mooi R.; 20 ♂♂, 19 ♀♀, Mtunzini Plantation, 5 mi. N. Mtunzini, 15 Nov. 1967 (Adults and nymphs on *Scirpus costatus* Boeck.); 2 ♂♂, Pietermaritzburg Burrow, Town Bush, elevation 3100 ft., 15 Apr. 1968; 1 ♀, Pinetown; 5 ♂♂, 26 ♀♀, Port Shepstone, 5.97; 7 ♂♂, 6 ♀♀, St. Lucia Estuary, 14 Nov. 1967 (Adults and nymphs on *Cyperus latifolius* Pair.); 1 ♂, Umbilo, Durban, 2.1.27 (Bevis); 1 ♀, Umgeni, 30.1.18 (Merve); 4 ♀♀, 5 mi. N. Umkomaas, 17 Apr. 1968; 4 ♀♀, Weenen, XI-XII.1923 (Thomasset). *Transvaal*—6 ♂♂, 6 ♀♀, 13 mi. S. Barberton, 5300 ft. elevation, 24 Mar. 1968 (Adults and nymphs on *Cyperus distans* L.); 8 ♂♂, 6 ♀♀, Bridal Veil Falls, Sabie, 29 Nov. 1967; 8 ♂♂, 20 ♀♀, Hartebeespoort Dam, 20 mi. W. Pretoria, 30 Oct. 1967; 4 ♀♀, Kruger Nat. Park, 9 mi. SSW Skukuza, 26 Apr. 1968; 1 ♀, Kruger Nat. Park, 3 mi. E. Skukuza Camp, 25 Apr. 1968; 2 ♀♀, Lake Chrissie, 6 Nov. 1967; 1 ♂, 5 ♀♀, Letaba Valley, Tzaneen Dist., XII-10-13-1958 (Capener); 1 ♂, 1 ♀, Louis Trichardt, Jan. & Feb. 1928 (Lawrence); 2 ♀♀, 10–15 miles SE Lydenburg, 7.V.51, 6500 ft. (Brinck and Rudebeck); 1 ♂, 1 ♀, 5 mi. N. Lydenburg, 30 Nov. 1967; 1 ♂, 10 mi. E. Machadodorp, 30 Nov. 1967, at

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FIGS. 182–196. Hallodapini male genitalia. Fig. 182. Lateral view of vesica, *Skukuza slateri*. Fig. 183. Phallotheca, *idem*. Fig. 184. Left clasper, *idem*. Fig. 185. Lateral view of vesica, *Systellonotus brincki*. Fig. 186. Apex of vesica, *idem*. Fig. 187. Phallotheca, *idem*. Fig. 188. Left clasper, *idem*. Fig. 189. Lateral view of vesica, *Trichophorella australis*. Fig. 190. Phallotheca, *idem*. Fig. 191. Lateral view of left clasper, *idem*. Fig. 192. Dorsal view of left clasper, *idem*. Fig. 193. Lateral view of vesica, *Trichophthalmocapsus hessei*. Fig. 194. Lateral view of vesica, *Trichophthalmocapsus australis*. Fig. 195. Phallotheca, *idem*. Fig. 196. Left clasper, *idem*.



light; 2 ♂♂, 2 ♀♀, 15 mi. NE Machadodorp, 4500 ft. elevation, 26–27 Mar. 1968; 6 ♂♂, 20 ♀♀, top Magoebaskloof, 6000 ft., 12 Dec. 1967; 1 ♂, Mariepskop near Klaserie, 6300 ft., 30 Nov. 1967; 1 ♀, 1.7 mi. N. Mooketsi, 13 Dec. 1967; 1 ♀, Pretoria, 3.II.1955 (Vari); 1 ♀, Sabie, 29 Nov. 1967; 26 ♂♂, 24 ♀♀, Little Sabie River, Sabie, 29 Nov. 1967; 1 ♀, 6 mi. N. Warmbaths, 7 Dec. 1967 (SANC, TM, SAM, BM[NH], USNM, HM, JAS, RTS).

ADDITIONAL SPECIMENS: *Cape Province*—7 nymphs (in alcohol), same data as holotype. *Natal*—17 nymphs (in alcohol), Mtunzini Plantation, 5 mi. N. Mtunzini, 15 Nov. 1967 (Adults and nymphs on *Scirpus costatus* Boeck.); 8 nymphs, St. Lucia Estuary, 14 Nov. 1967 (Adults and nymphs on *Cyperus latifolius* Pair.). *Transvaal*—27 nymphs (in alcohol), Little Sabie River, Sabie, 29 Nov. 1967 (RTS).

This species is named for its occurrence in southern Africa.

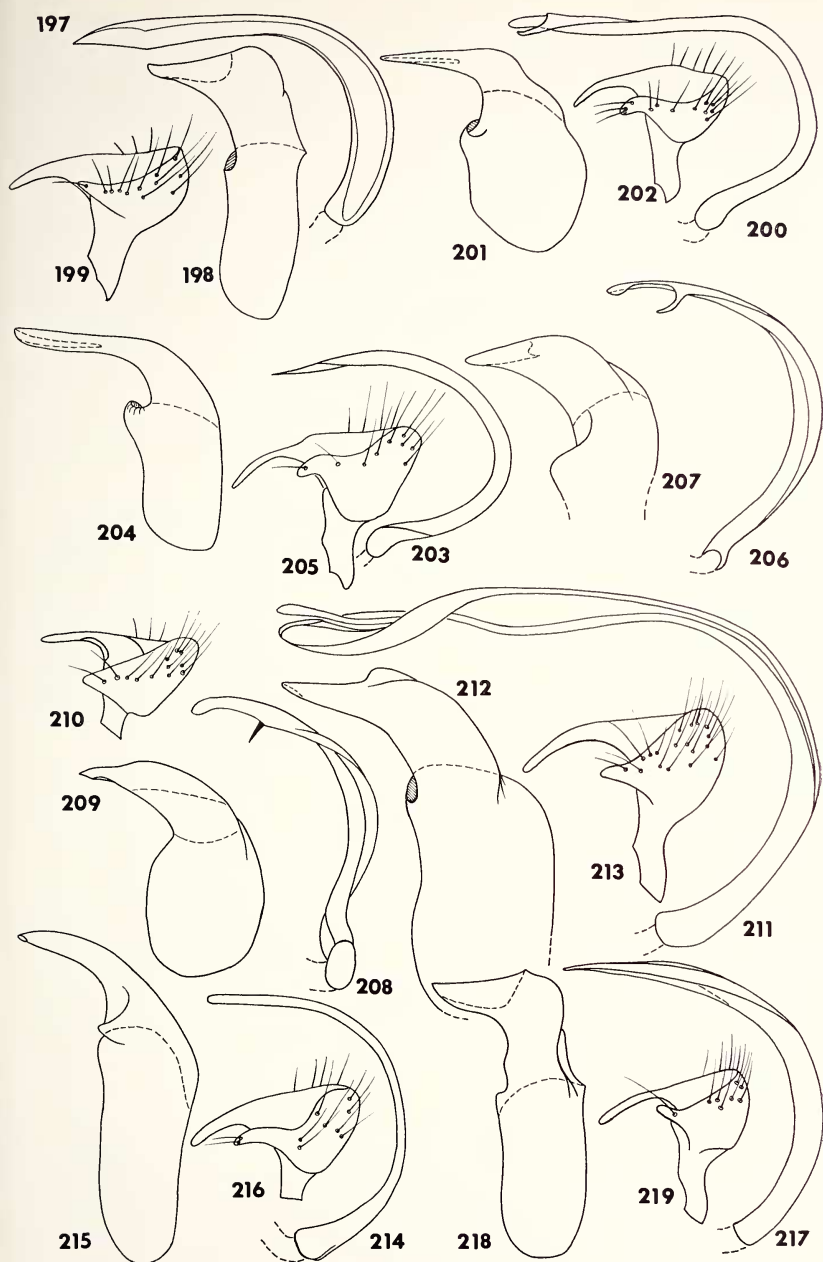
Paramixia australis is usually nearly all black, but may have extensive reddish markings, particularly on the hemelytra. It can be separated from *suturalis*, the only other described species of *Paramixia* from South Africa, as follows: the basic coloration is generally black; the proximal fifth of antennal segment 1 is black, and the distal four-fifths tan; the spines of the metatibiae have black bases; and, the vesica forms a smooth "C".

Carvalho et al. (1960) incorrectly recorded *australis* from South Africa as *Sthenarus basalis* Poppius.

The distribution of *australis* is sympatric with that of *suturalis*, where *suturalis* occurs, and also extends over most of the remainder

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FIGS. 197–219. Leucophoropterini, *Karoocapsus* male genitalia. Fig. 197. Lateral view of vesica, *K. bifasciatus*. Fig. 198. Phallosheca, *idem*. Fig. 199. Left clasper, *idem*. Fig. 200. Lateral view of vesica, *K. brunneus*. Fig. 201. Phallosheca, *idem*. Fig. 202. Left clasper, *idem*. Fig. 203. Lateral view of vesica, *K. middelburgensis*. Fig. 204. Phallosheca, *idem*. Fig. 205. Left clasper, *idem*. Fig. 206. Lateral view of vesica, *K. flavomaculatus*. Fig. 207. Phallosheca, *idem*. Fig. 208. Lateral view of vesica, *K. obscurus*. Fig. 209. Phallosheca, *idem*. Fig. 210. Left clasper, *idem*. Fig. 211. Lateral view of vesica, *K. occidentalis*. Fig. 212. Phallosheca, *idem*. Fig. 213. Left clasper, *idem*. Fig. 214. Lateral view of vesica, *K. pulchrus*. Fig. 215. Phallosheca, *idem*. Fig. 216. Left clasper, *idem*. Fig. 217. Lateral view of vesica, *K. trifasciatus*. Fig. 218. Phallosheca, *idem*. Fig. 219. Left clasper, *idem*.



of the low and midaltitude regions of South Africa, although the Kalahari, Karoo, and South West Africa have not been well enough collected to know if it occurs there. Before we began our collecting in 1967–1968 only 52 specimens from 12 localities were to be found in all available collections. It is now known that *australis* is one of the most common and widespread species of Phylinae in South Africa.

Known host plants for this species include *Scirpus dioecus* Boeck., *Scirpus costatus* Boeck., *Cyperus rotundus* L., *Cyperus latifolius* Pair., and *Cyperus distans* L. (see also discussion under *P. suturalis*).

***Paramixia suturalis* Reuter**

Figures 92, 335

Paramixia suturalis Reuter, 1900, p. 264.—Lindberg, 1958, p. 105.—Carvalho, 1958a, p. 86.—Linnavuori, 1961, p. 23.—Wagner, 1970a, pp. 4–5.

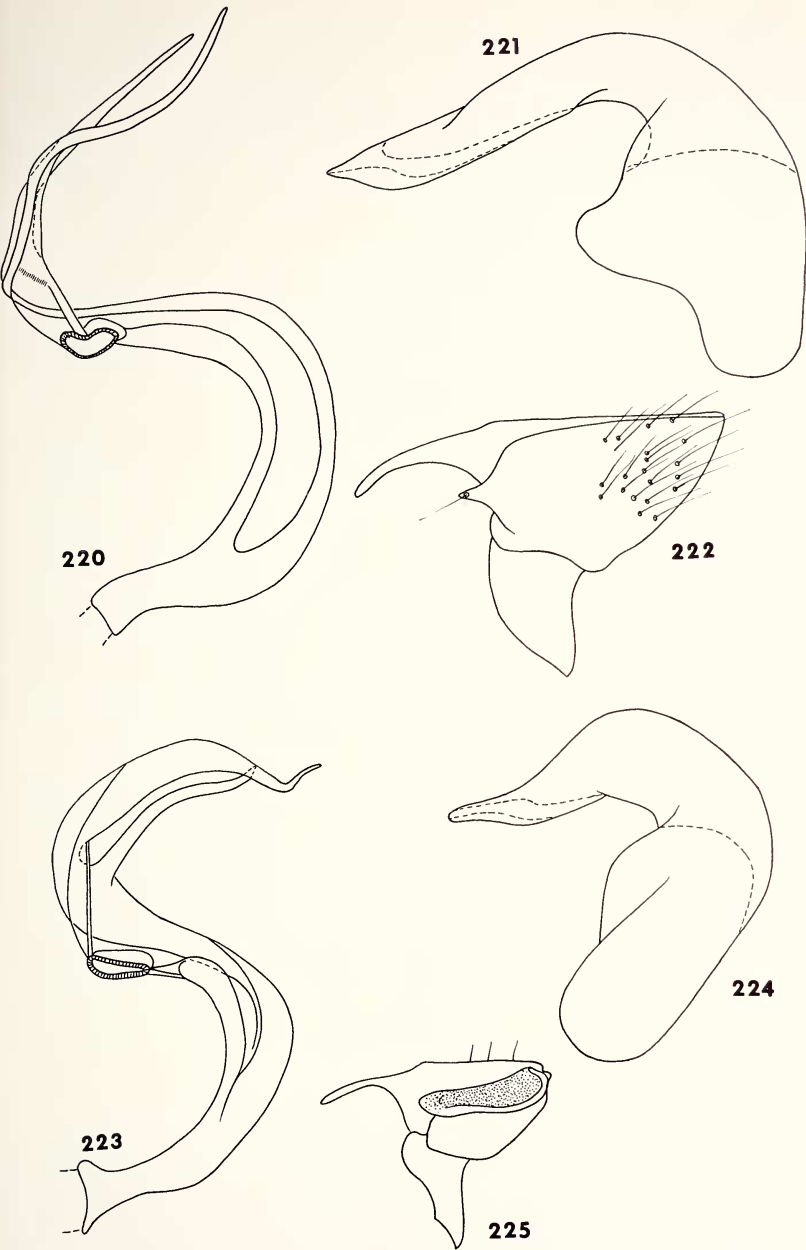
Troitskiella minuta Poppius, 1914a, pp. 81–82. **New Synonymy.**

Paramixia suturalis can be recognized by the following characters: basic coloration usually light yellow green, some specimens medium brown; antennal segment 1 entirely brownish black; metatibial spines without dark bases, tibiae unicolorous tan; and, vesica C-shaped, but rather sharply bent subapically, apical section “wavy” (Figure 335). The male genitalia of specimens from South Africa agree very closely in structure with those of specimens from the Cape Verde Islands (Lindberg, 1958) and the Nile Valley.

Wagner (1970a) redescribed *Paramixia suturalis* and provided illustrations. As noted above, Wagner’s (1970a) interpretation of the structure of the parempodia in *Paramixia* was incorrect and therefore his illustrations of these structures are not accurate. Wagner examined 3 specimens of *suturalis* from the Helsinki Museum, from which Reuter (1900) apparently originally described the species, but did not designate a lectotype. I have selected a male bearing the following labels as the lectotype: “Vall, Nil.”; “spec. typ. Reuter”; “Mus. Zool. H:fors, Spec. typ. No. 3443, *Paramixia*

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FIGS. 220–225. Phylini, *Austropsallus* male genitalia. Fig. 220. Lateral view of vesica, *Austropsallus drakensbergensis*. Fig. 221. Phallosheca, *idem*. Fig. 222. Left clasper, *idem*. Fig. 223. Lateral view of vesica, *Austropsallus middelburgensis*. Fig. 224. Phallosheca, *idem*. Fig. 225. Left clasper, *idem*.



suturalis Reut.". I have also added the label "LECTOTYPE *Paramixia suturalis* Reuter, det. R.T. Schuh."

Examination of the holotype of *Troitskiella minuta* Poppius indicates that the coloration of this species fits well within the range of variation found in *P. suturalis* and that the external morphology and structure of the male genitalia are identical with *suturalis* from the Nile Valley and from South Africa. I am therefore synonymizing *Troitskiella minuta* Poppius with *Paramixia suturalis* Reuter.

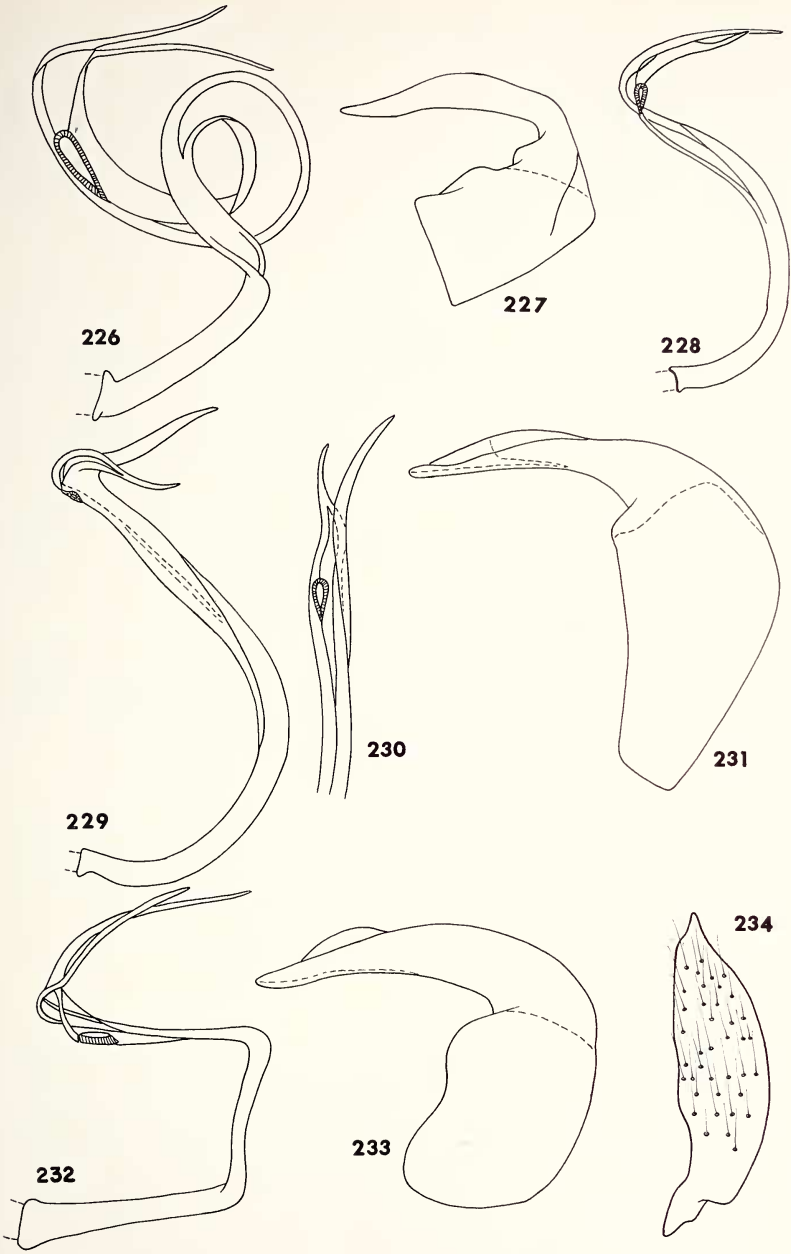
Paramixia suturalis is a primarily tropical species occurring in East and West Africa and extending northward into the southern Mediterranean and southward into southern Africa. In South Africa this species is restricted to the coastal region of Natal, the lowveld of the eastern Transvaal, and from Pretoria north into the interior of the Transvaal.

Lindberg (1958) recorded *suturalis* as occurring on Cyperaceae and Gramineae, and specifically on *Cynodon dactylon*. In South Africa it breeds on *Juncus kraussii* Hochst., *Scirpus costatus* Boeck., and *Cyperus latifolius* Pair. In nearly all situations where I collected *suturalis* in South Africa it was living in association with *Paramixia australis*, *Cymodema basicornis* (Motschulsky), *Cymodema tabida* Spinola, and less commonly with *Cymus waelbroeckii* and an additional undescribed species of *Cymus*.

SPECIMENS EXAMINED: Natal—1 ♀, Eshowe, 15 Nov. 1967; 1 ♂, 3 ♀♀, Mtunzini Plantation, 5 mi. N. Mtunzini, 15 Nov. 1967 (Adults and nymphs on *Scirpus costatus* Boeck.); 11 ♂♂, 17 ♀♀, St. Lucia Estuary, 14 Nov. 1967 (Adults and nymphs on *Juncus kraussii* Hochst. and *Cyperus latifolius* Pair.). Transvaal—1 ♀, Harebeespoort Dam, 20 mi. W. Pretoria, 30 Oct. 1967; 6 ♂♂, 2 ♀♀, Little Sabie River, Sabie, 29 Nov. 1967; 1 ♀, 17 mi. N. Louis Trichardt, 14 Dec. 1967; 1 ♂, Kruger Nat. Park, confluence of Limpopo and Luvuvho Rivers, Pafuri, 7 May 1968; 1 ♂, 1 nymph, Kruger Nat. Park, 8 mi. W. Shingwidzi, Shingwidzi River, 4 May 1968; 1 ♀, top Magoebaskloof, 6000 ft., 12 Dec. 1967 (SANC, HM, BM[NH], JAS, RTS).

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FIGS. 226–234. Phylini, *Austropsallus* male genitalia. Fig. 226. Lateral view of vesica, *A. albonotum*. Fig. 227. Phallotheca, *idem*. Fig. 228. Lateral view of vesica, *A. senecionus*. Fig. 229. Lateral view of vesica, *A. saniensis*. Fig. 230. Apex of vesica, *idem*. Fig. 231. Phallotheca, *idem*. Fig. 232. Lateral view of vesica, *A. helichrysi*. Fig. 233. Phallotheca, *idem*. Fig. 234. Right clasper, *idem*.



Pilophorus Hahn

Pilophorus Hahn, 1826, p. 22.

This very large genus is poorly represented in Africa, with only one known species. Most described members of the genus are Nearctic and Palearctic, but a large undescribed fauna is present in Southeast Asia. No species of *Pilophorus* are known from the Neotropical Region.

Pilophorus pilosus Odhiambo

Pilophorus pilosus Odhiambo, 1958b, pp. 326–330.

Pilophorus pilosus can be separated from all other South African Miridae by the following combination of characters: the parempodia are fleshy, convergent apically, and recurved; and the dorsum is black with narrow, transverse bands of scale-like, sericeous hairs on the clavus and corium. Odhiambo (1958b) in the original description of this species, provided excellent illustration of the male genitalia and the hemelytra. The type specimens of *pilosus* from Uganda agree very closely with all specimens known from South Africa.

No host or ecological information is available for *pilosus*.

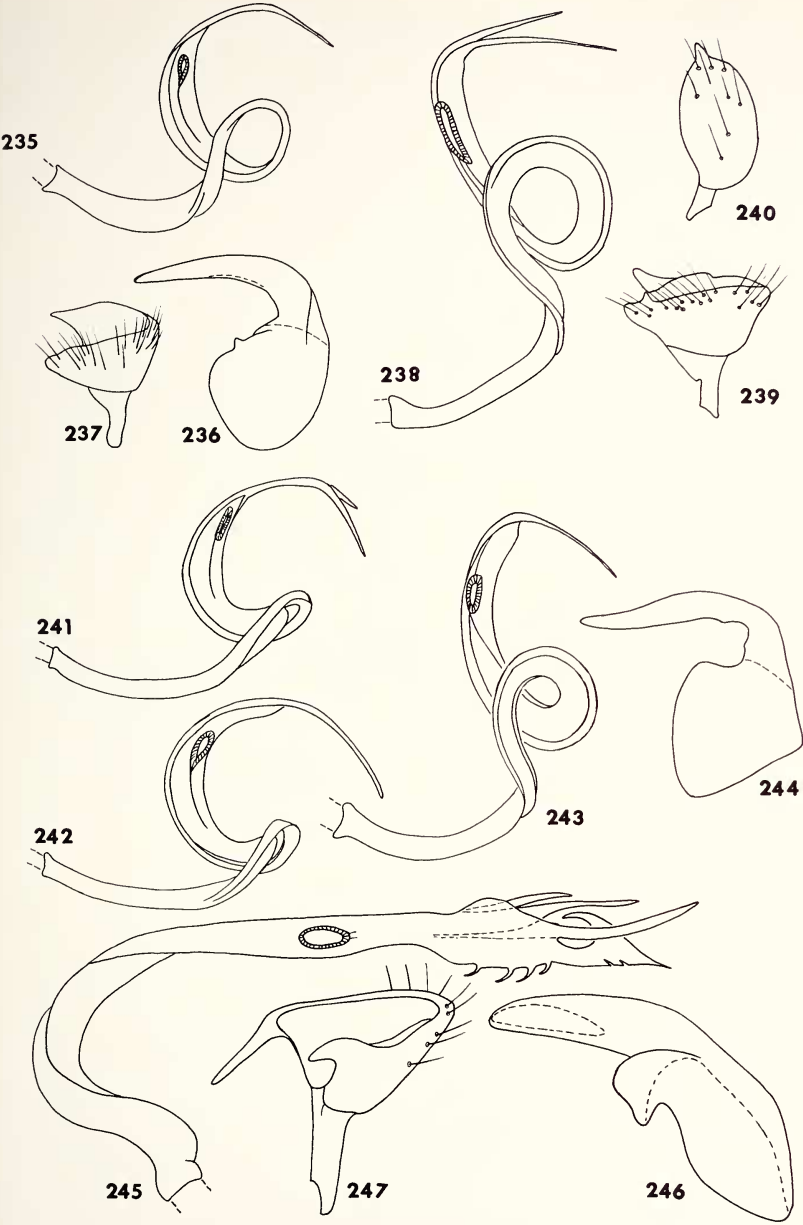
SPECIMENS EXAMINED: Natal—4 macropterous ♂♂, 1 macropterous ♀, Port Shepstone, 5.97. *Transvaal*—1 ♀, Letaba Valley, Tzaneen Dist., XII-20-1962 (Capener) (BM[NH], JAS, RTS).

ZOOGEOGRAPHY

No attempts have been made to analyze the zoogeography of the Miridae of southern Africa. In the following discussion I have tried to bring together those factors which seem to be most important in influencing the distributional patterns of the Orthotylinae and Phylinae in this region.

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FIGS. 235–247. Phylini male genitalia. Fig. 235. Lateral view of vesica, *Capecapsus tradouwensis*. Fig. 236. Phallotheca, *idem*. Fig. 237. Left clasper, *idem*. Fig. 238. Lateral view of vesica, *Coatonocapsus transvaalensis*. Fig. 239. Left clasper, *idem*. Fig. 240. Right clasper, *idem*. Fig. 241. Lateral view of vesica, *Coatonocapsus johannsmeieri*. Fig. 242. Lateral view of vesica, *Coatonocapsus pallidus*. Fig. 243. Lateral view of vesica, *Coatonocapsus sweeti*. Fig. 244. Phallotheca, *idem*. Fig. 245. Lateral view of vesica, *Denticulophallus adenandrae*. Fig. 246. Phallotheca, *idem*. Fig. 247. Left clasper, *idem*.



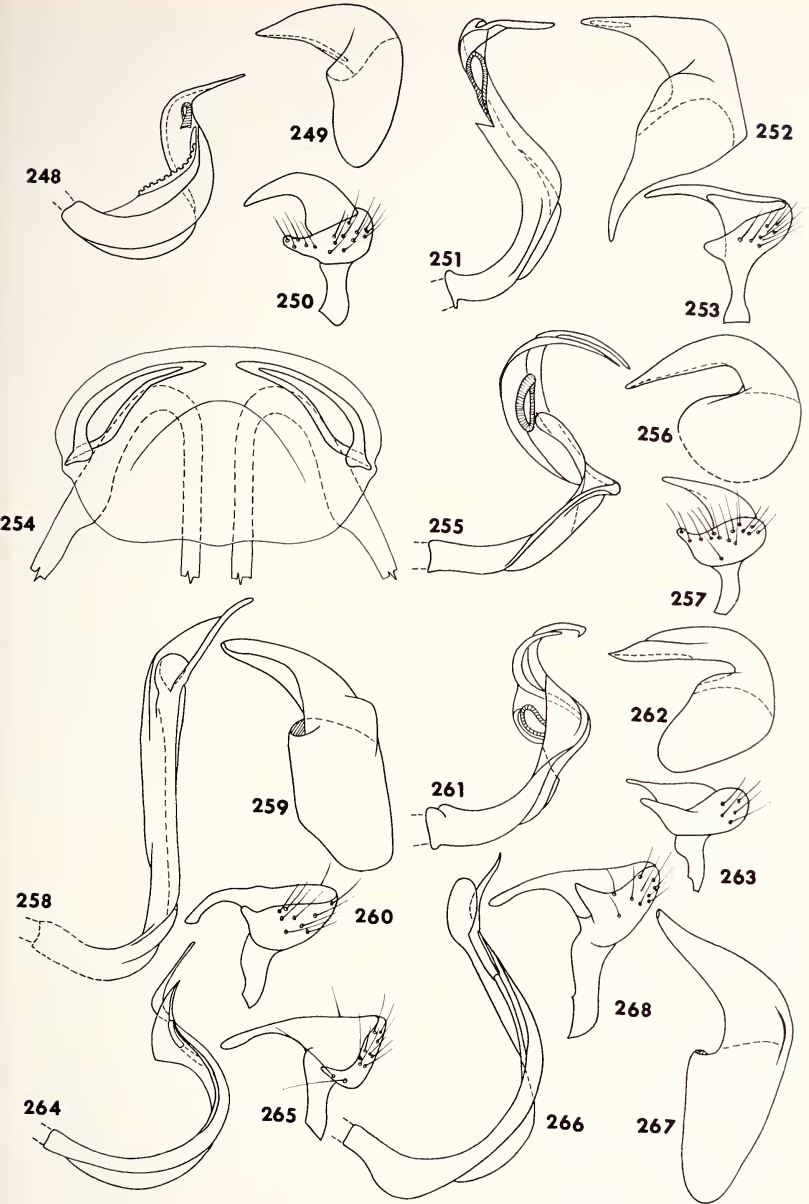
The Miridae as a group are largely phytophagous, or if predatory they are often host specific on a given species of phytophagous insect. Thus, one would expect the distributions of host plants to be important in considering the distributions of mirids. Aside from edaphic factors, it seems that precipitation is the most important single factor affecting plant distributions (Stuckenberg, 1969) and therefore it must be important in determining the distributions of the Miridae in at least an indirect way.

As pointed out by Stuckenberg (1969), the South African flora can be divided into three basic components which are roughly correlated with the amounts of rainfall and the rainfall regime. These are (1) the "Karoo" and (2) the "tropical and subtropical forest and grassland," which receive most of their precipitation during the summer months, and (3) the "macchia" which receives most of its rainfall during the winter months. Sufficient data do not exist at present to allow for a careful correlation of the distribution of the mirid fauna with the floral types of South Africa, but certainly a strong affinity does exist at least between the endemic Orthotylinae and Phylinae and the almost totally endemic floras of the Southwest Cape (primarily macchia) and the Karoo (see following analyses).

Recently Stuckenberg (1969) has applied H.P. Bailey's (1960) concept of "effective temperature" (denoted as "ET" in the following text) to South Africa and shown that the distributions of snakes and amphibians agree remarkably well with this measure of effective solar radiation. Stuckenberg (1969) points out that in using an effective temperature analysis the biologies of the animals under consideration must be taken into account, especially for those

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FIGS. 248-268. Phylini male and female genitalia. Fig. 248. Lateral view of vesica, *Ellenia obscuricornis*. Fig. 249. Phallosome, *idem*. Fig. 250. Left clasper, *idem*. Fig. 251. Lateral view of vesica, *Emimoculus drosanthemi*. Fig. 252. Phallosome, *idem*. Fig. 253. Left clasper, *idem*. Fig. 254. Sclerotized rings, *idem*. Fig. 255. Lateral view of vesica, *Lamprosthenarus near sjostedti*. Fig. 256. Phallosome, *idem*. Fig. 257. Left clasper, *idem*. Fig. 258. Lateral view of vesica, *Lasiolabopella capeneri*. Fig. 259. Phallosome, *idem*. Fig. 260. Left clasper, *idem*. Fig. 261. Lateral view of vesica, *Lepidocapsus rubrum*. Fig. 262. Phallosome, *idem*. Fig. 263. Left clasper, *idem*. Fig. 264. Lateral view of vesica, *Macrotylus niger*. Fig. 265. Left clasper, *idem*. Fig. 266. Lateral view of vesica, *Macrotylus hemizygiae*. Fig. 267. Phallosome, *idem*. Fig. 268. Left clasper, *idem*.



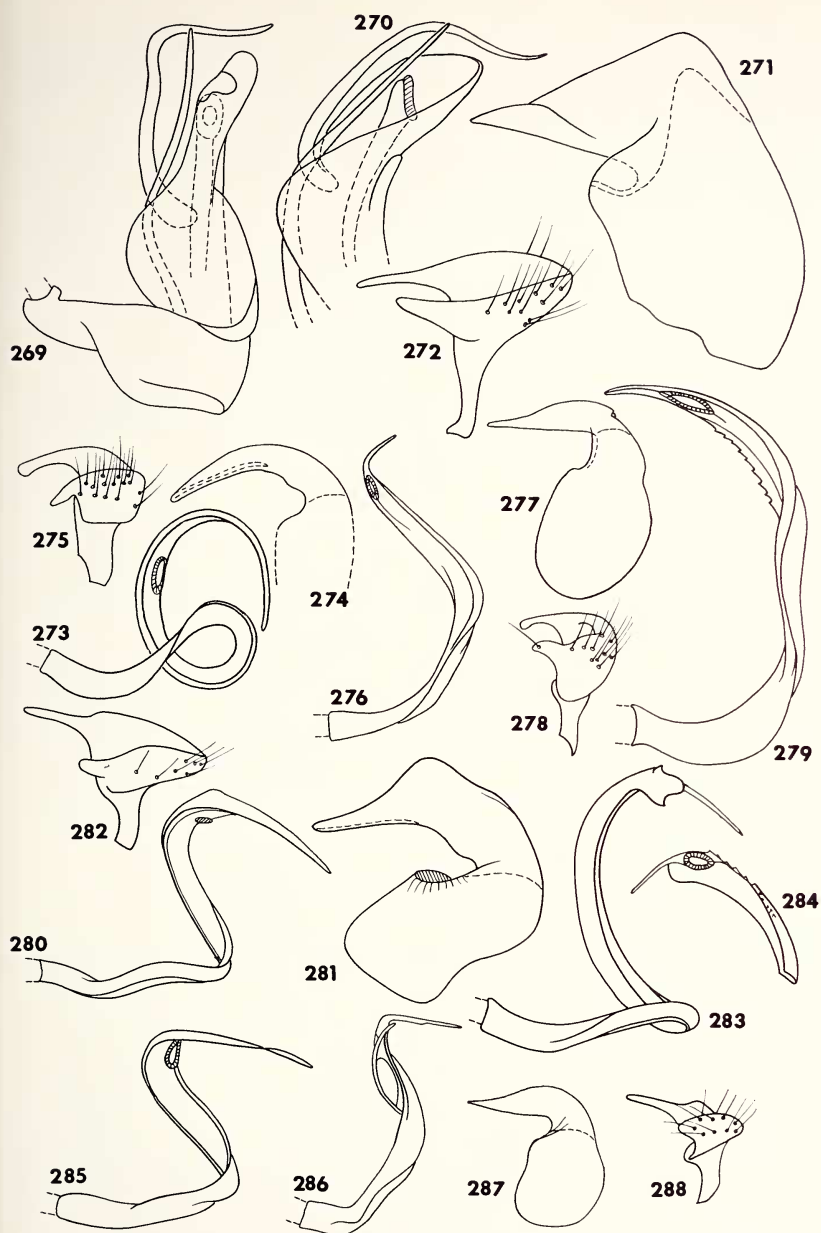
animals that have an ability to control their environment. Certain taxa in the Orthotylinæ and Phylinae (e.g. *Paramixia* and *Pangania*) are obviously restricted by factors other than host plant distributions in that the distributions of the mirid taxa are limited in South Africa, whereas the hosts are much more wide-ranging. This would suggest then, that distributions of at least certain of the Miridae are amenable to an "effective temperature" analysis. In those cases where adequate distributional data are available a positive correlation does seem to exist (see below).

Consideration of the distributions of the Orthotylinæ and Phylinae in relation to the long term evolution of the fauna in South Africa is difficult because no fossils exist by which it is possible to determine dates of origin. Even though it is not possible to determine the antiquity of the South African fauna, certain strong correlations appear to exist between the distributions of the Orthotylinæ and Phylinae (especially the endemic elements) and the South African paleogenic element.

Stuckenberg (1962) recognized two centers of paleogenic endemism in South Africa—the Cape Center and the Eastern Highlands Center. In the Orthotylinæ and Phylinae group "1a" (see below) in the endemic fauna fits closely with Stuckenberg's Cape Center and group "1b" with his Eastern Highlands Center. Stuckenberg (1962) felt that the Eastern Highlands Center was the node from which many paleogenic groups have spread. He based this conclusion on the ancient nature of the region, which was formed by the pre-Cretaceous Stormberg lava series, and the fact that much of the Cape Center was drowned by Cretaceous seas. The greater

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FIGS. 269–288. Phylini male genitalia. Fig. 269. Lateral view of vesica, *Natalophylus heteromorphae*. Fig. 270. Apex of vesica, *idem*. Fig. 271. Phallotheca, *idem*. Fig. 272. Left clasper, *idem*. Fig. 273. Lateral view of vesica, *Odhiamboella solani*. Fig. 274. Phallotheca, *idem*. Fig. 275. Left clasper, *idem*. Fig. 276. Lateral view of vesica, *Parasciodema albicoxa*. Fig. 277. Phallotheca, *idem*. Fig. 278. Left clasper, *idem*. Fig. 279. Lateral view of vesica, *Parasciodema nigrifemur*. Fig. 280. Lateral view of vesica, *Stoebea barbertonensis*. Fig. 281. Phallotheca, *idem*. Fig. 282. Left clasper, *idem*. Fig. 283. Lateral view of vesica, *Stoebea elginensis*. Fig. 284. Apex of vesica (obverse view), *idem*. Fig. 285. Lateral view of vesica, *Stoebea plettenbergensis*. Fig. 286. Lateral view of vesica, *Widdringtoniola kirstenboschiana*. Fig. 287. Phallotheca, *idem*. Fig. 288. Left clasper, *idem*.



diversity and morphological specialization of the Orthotylinae and Phylinae in the Cape Center suggests that area as containing the most isolated elements in the South African fauna, and thus possibly being the evolutionary center for these taxa.

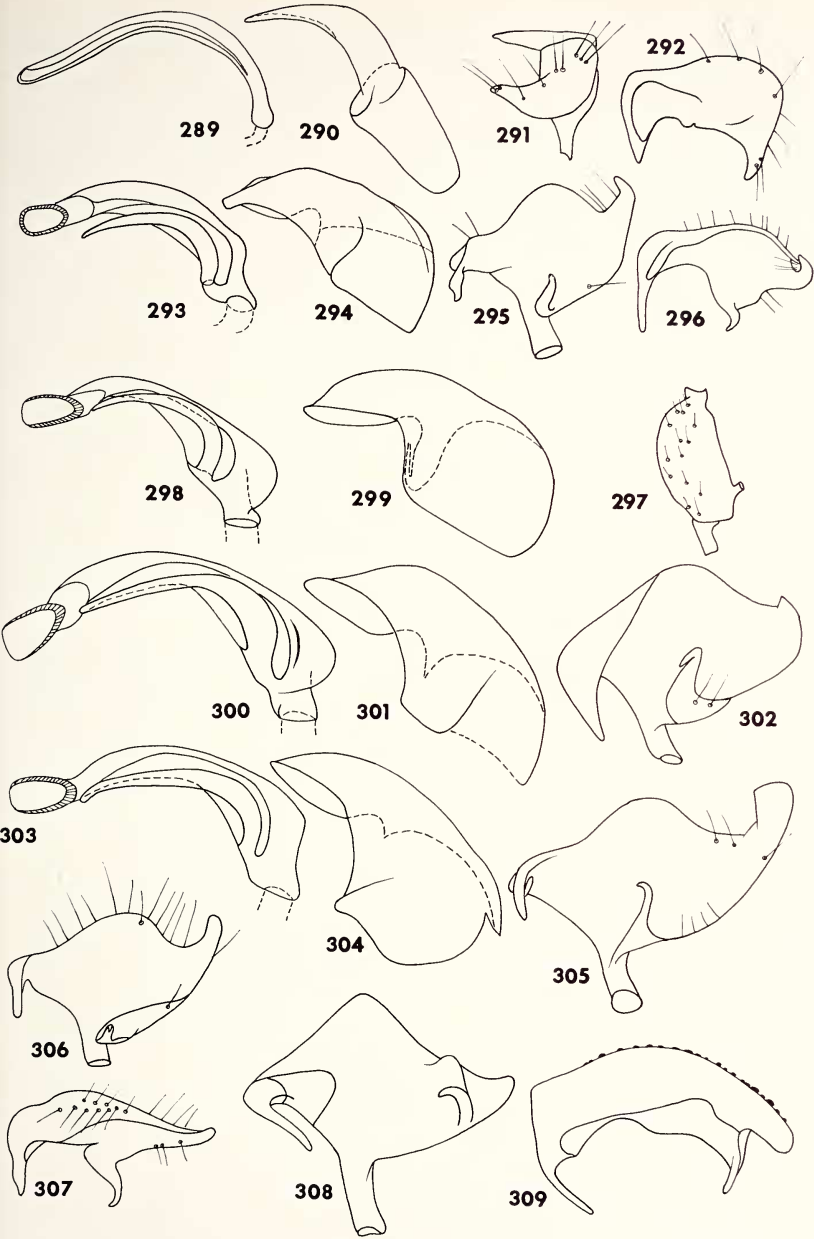
Recent evidence from continental drift suggests that Africa has moved northward (Dietz and Holden, 1970) and therefore the region of Mediterranean climate has probably been reduced. Also, Pleistocene pluvials probably created an increased area of Mediterranean climate and allowed for northward expansion of the flora and fauna that is now compressed into the Southwest Cape (see van Zinderen Bakker, 1967). Both of these factors may thus be important in the evolutionary history of the Cape Center and help to explain the tremendous diversity that is found there as well as to eliminate, at least in part, the need for "explosive local evolution" as proposed by Stuckenberg (1962).

Although certain groups of plants and animals have transantarctic distributions including South Africa, no evidence exists for such a pattern within the Orthotylinae and Phylinae except possibly in the Leucophoropterini (see tribal discussion). This apparent absence of circumaustral distributions may be the result of incomplete taxonomic knowledge, and certainly merits further investigation.

The seasonal distribution of the Miridae in South Africa is at best only poorly understood. Knight (1941; 1968) has confirmed in North America that mirid reproduction generally takes place during the height of growth and flowering in the host. It is at this

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FIGS. 289–309. Phylini, *Parapseudosthenarus* and *Pseudosthenarus* male genitalia. Fig. 289. Lateral view of vesica, *Parapseudosthenarus buchenroederiae*. Fig. 290. Phallosome, *idem*. Fig. 291. Lateral view of left clasper, *idem*. Fig. 292. Dorsal view of left clasper, *idem*. Fig. 293. Lateral view of vesica, *Pseudosthenarus ater* (Cape of Good Hope). Fig. 294. Phallosome, *idem*. Fig. 295. Posterior view of left clasper, *idem*. Fig. 296. Dorsal view of left clasper, *idem*. Fig. 297. Right clasper, *idem*. Fig. 298. Lateral view of vesica, *P. ater* (Oudtshoorn District). Fig. 299. Phallosome, *idem*. Fig. 300. Lateral view of vesica, *P. ater* (Calvinia). Fig. 301. Phallosome, *idem*. Fig. 302. Posterior view of left clasper, *idem*. Fig. 303. Lateral view of vesica, *Pseudosthenarus grossus*. Fig. 304. Phallosome, *idem*. Fig. 305. Posterior view of left clasper, *idem*. Fig. 306. Posterior view of left clasper, *P. rozeni*. Fig. 307. Dorsal view of left clasper, *idem*. Fig. 308. Posterior view of left clasper, *P. namaquaensis*. Fig. 309. Dorsal view of left clasper, *idem*.



time that the foliage is most succulent. The life cycles of mirids are thus rather short, terminating with the laying of eggs in plant tissue and diapause in the egg stage until the plant begins growing again the following season. Because a distinct summer-winter seasonality exists for most of South Africa and plant growth is correlated with this, it can be predicted that mirid abundance will be greatest in spring and early summer. The limited temporal samples that are available to some extent confirm this, particularly in the Southwest Cape.

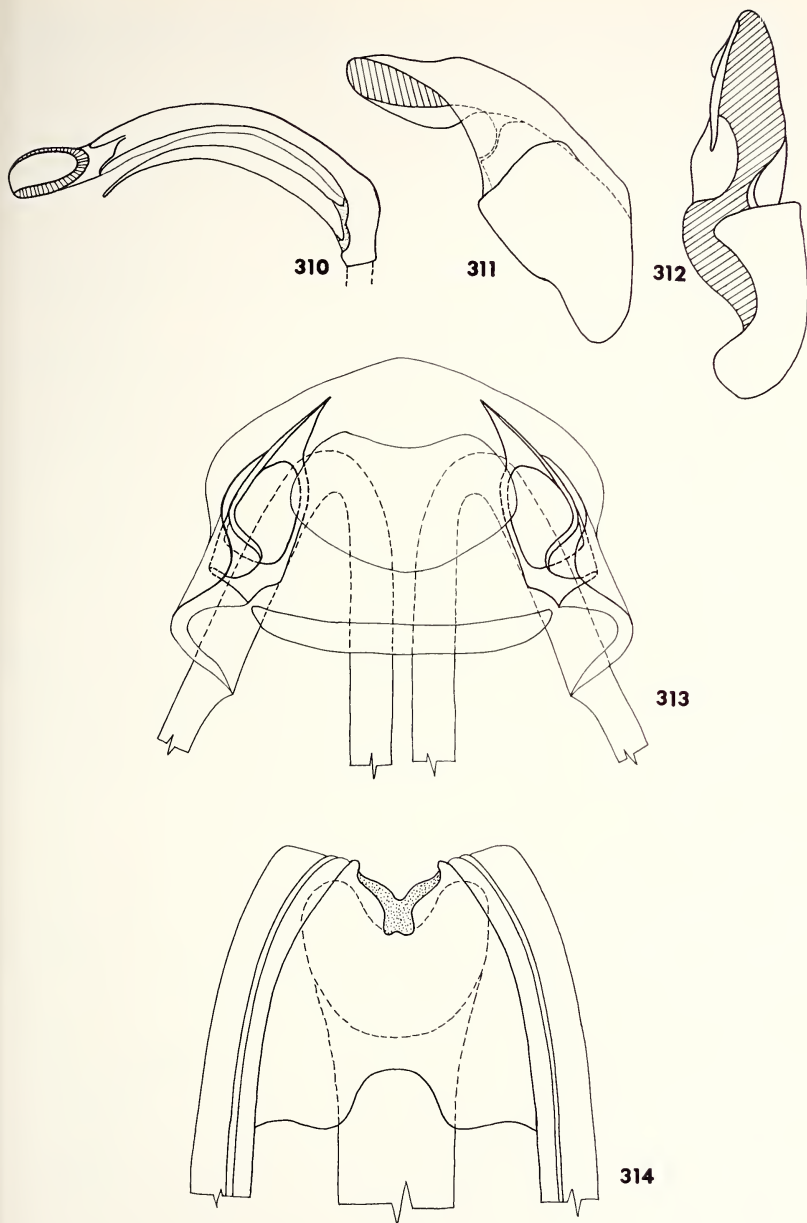
As noted by Stuckenberg (1962), the known distributions of many groups of animals in South Africa may reflect the activity patterns of entomologists. This should be borne in mind in the following analysis. Areas within South Africa for which the mirid fauna has been very poorly sampled include: the dry arid areas of the northwestern Transvaal; the Eastern Cape; the Orange Free State; the Northern Cape; the Great Karoo; Namaqualand; South West Africa; and, the Tsitsikama Forest area. Two areas of particular interest in South Africa, the Southwest Cape and the Drakensberg have received limited collecting, but deserve much greater attention than has been given in the past, particularly in view of the rapid shrinkage of the endemic flora.

The Orthotylinae and Phylinae of South Africa can be divided into five components: 1) endemic; 2) tropical African; 3) paleotropical; 4) pantropical; and 5) cosmopolitan (including holarctic elements).

1) The following genera are endemic to South Africa (those in parentheses are known only from a limited number of localities and may prove to be more widely distributed): *Austropsallus*, *Carinogulus*, *Coatonocapsus*, *Denticulophallus*, *Eminoculus*, (*Lasiolabopella*), *Karoocapsus*, *Namaquacapsus*, *Natalophylus*, *Neoambonea*, *Nichomachus*, *Parambonea*, *Parapseudosthenarus*, *Parasciodema*, *Pseudambonea*, *Pseudonichomachus*, *Pseudopilophorus*, *Pseudosthenarus*, *Stoebea*, *Widdringtoniola*, and (*Zanchiella*). They occur primarily in the Southwest Cape and the Drakensberg, are morphologically isolated, and have speciated in the region.

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FIGS. 310-314. Phylini, *Pseudosthenarus* male and female genitalia. Fig. 310. Lateral view of vesica, *P. namaquaensis*. Fig. 311. Phal-lotheca, *idem*. Fig. 312. Ventral view of phal-lotheca, *idem*. Fig. 313. Sclerotized rings, *idem*. Fig. 314. Posterior wall, *idem*.



2) The tropical African element in South Africa is composed of the following genera: *Aloea*, *Ambonea*, *Felisacodes*, *Formicopsella*, *Lamprosthenarus*, *Lepidocapsus*, *Myombea*, *Nanniella*, *Odhiamboella*, *Pangania*, *Plagiognathidea*, *Skukuza*, *Systellonotopsis*, *Trichophorella*, and *Trichophthalmocapsus*. Most of these genera are restricted to sub-Saharan Africa, although *Aloea* is known from North Africa and also from the Arabian Peninsula (Linnavuori, personal communication).

3) Genera occurring in South Africa which have paleotropical distributions are *Acrorrhinium*, *Azizus*, *Hallodapus*, *Pseudoloxops*, *Systellonotus*, and *Zanchius*.

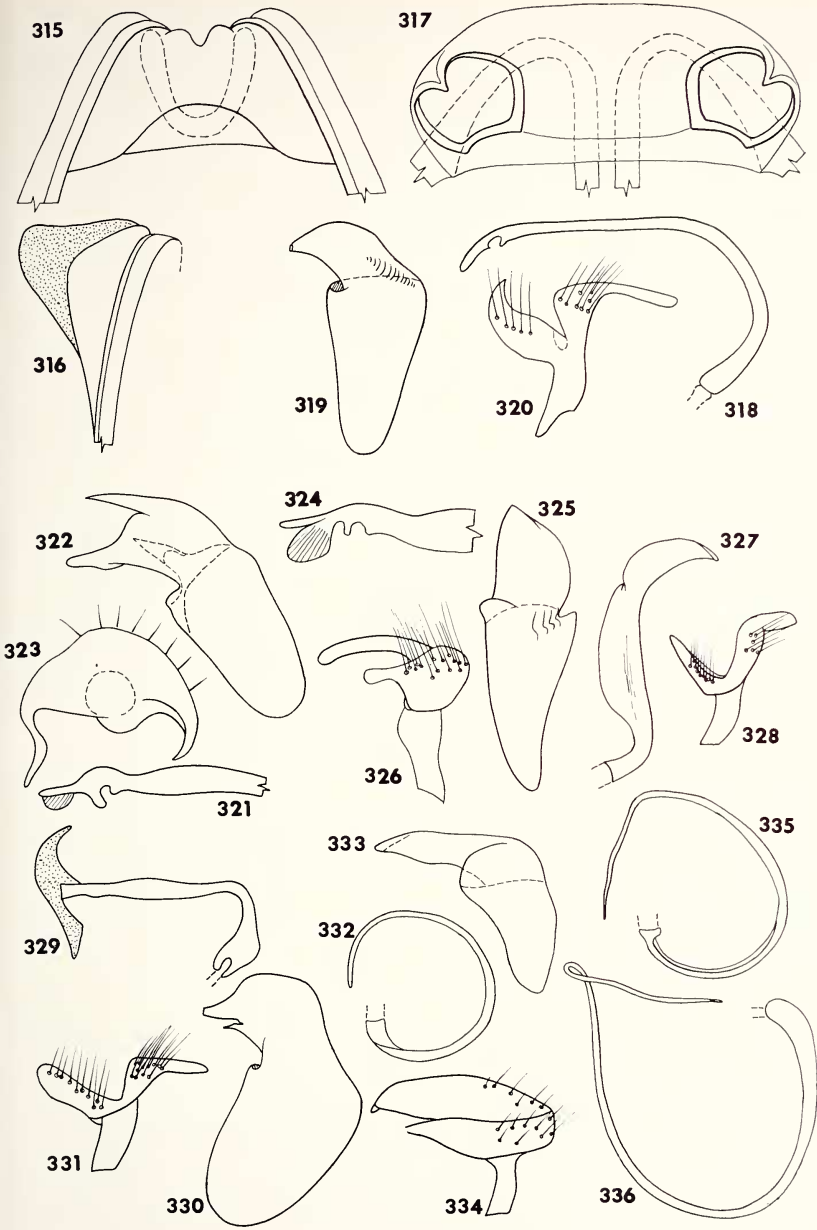
4) Pantropical genera in South Africa are *Ellenia* and *Paramixia*.

5) Cosmopolitan genera in South Africa are *Cyrtorhinus*, *Halticus*, *Macrotylus*, *Orthotylus*, *Pilophorus*, *Psallus*, *Sthenarus-Campylomma*, and *Tytthus*. Not all of these genera are truly cosmopolitan but all show very wide distributions; some are not presently well known from certain regions, particularly South America and Australia. Such genera as *Orthotylus*, *Pilophorus*, *Psallus*, and *Sthenarus-Campylomma* are very large and complex and in need of monographic revision; the presently recorded distributions for these genera may be inaccurate since some may not represent monophyletic units.

The 54 genera of South African Orthotylinae and Phylinae show several more or less distinct distributional patterns within the region. They correlate well with those known for other groups, including the Lygaeidae (see Slater, 1964), other insect groups (see Stucken-

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FIGS. 315–336. Pilophorini male and female genitalia. Fig. 315. Anterodorsal view of posterior wall, *Aloea samueli*. Fig. 316. Lateral view of posterior wall, *idem*. Fig. 317. Sclerotized rings, *idem*. Fig. 318. Lateral view of vesica, *idem*. Fig. 319. Phallotheca, *idem*. Fig. 320. Anterior view of left clasper, *idem*. Fig. 321. Apex of vesica, *Ambonea munroi*. Fig. 322. Phallotheca, *idem*. Fig. 323. Dorsal view of left clasper, *idem*. Fig. 324. Apex of vesica, *Ambonea rustenburgensis*. Fig. 325. Phallotheca, *idem*. Fig. 326. Lateral view of left clasper, *idem*. Fig. 327. Lateral view of vesica, *Parambonea transvaalensis*. Fig. 328. Anterior view of left clasper, *idem*. Fig. 329. Lateral view of vesica, *Neoambonea cynanchi*. Fig. 330. Phallotheca, *idem*. Fig. 331. Anterior view of left clasper, *idem*. Fig. 332. Lateral view of vesica, *Paramixia australis*. Fig. 333. Phallotheca, *idem*. Fig. 334. Left clasper, *idem*. Fig. 335. Lateral view of vesica, *Paramixia suturalis*. Fig. 336. Lateral view of vesica, *Paramixia nigra*.



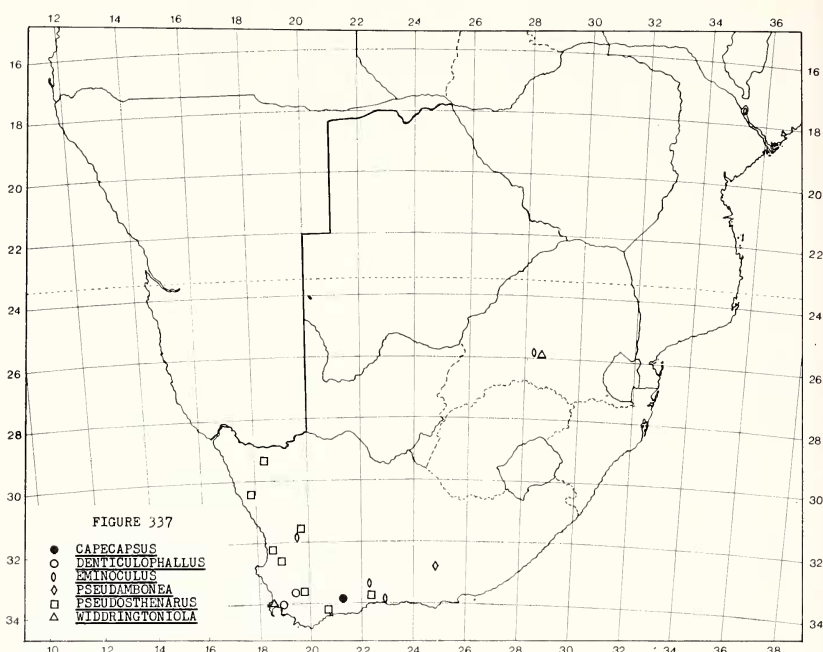


FIG. 337. Distribution of six genera of the Miridae in South Africa (see text for explanation).

berg, 1962) and non-insects including Amphibia and Reptilia (see Poynton, 1964; Stuckenberg, 1969). The five main patterns are discussed below, but must be considered as strictly tentative because of the infant state of the taxonomy of the South African Miridae. Distributions which are anomalous and cannot be analyzed with certainty are discussed under the most appropriate heading or in a general section at the end.

1) The most important pattern is that of endemic species distributions. This is the largest element of the South African fauna, representing 43% of the total genera. It can best be portrayed by division into several subgroups.

a) The most restricted pattern involves taxa confined to the Southwest Cape and Karoo (including portions of Namaqualand) (Figure 337) which are probably adapted to the unique flora of the area. Included genera are: *Eminoculus*, *Denticulophallus*, *Widdringtoniola*, *Pseudosthenarus*, and *Capecapsus*. The first three taxa are known to occur on endemic plant genera. The host of *Pseudo-*

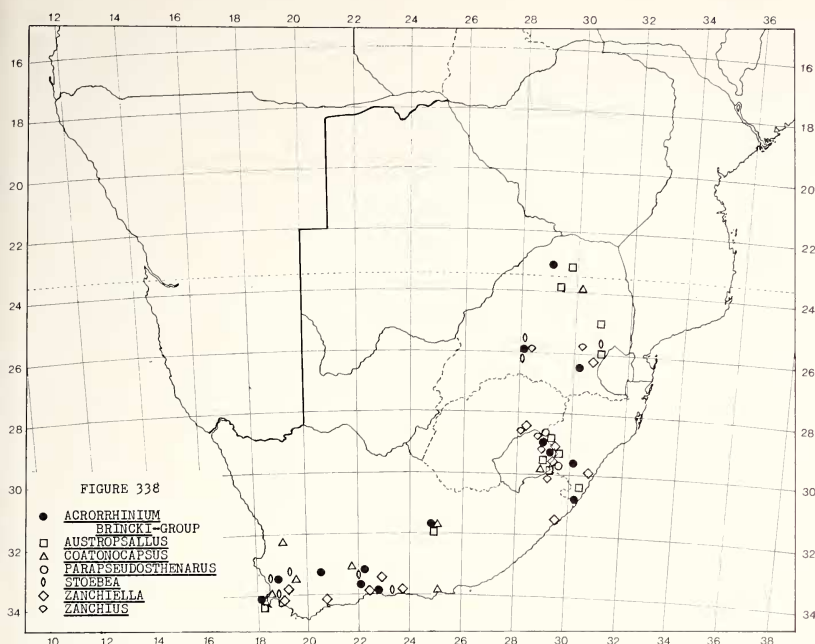


FIG. 338. Distribution of seven genera of the Miridae in South Africa (see text for explanation).

sthenarus is not known, but the most closely related genus, *Parapseudosthenarus*, occurs at midaltitudes on the Drakensberg in Natal on *Buchenroedera* (Leguminosae), a plant genus which is endemic to Africa and almost completely restricted to South Africa (Phillips, 1951). The occurrence of *Widdringtoniola* and *Eminoculus* in the Transvaal is almost certainly the result of transplanting the hosts as ornamentals in Pretoria. The morphological distinctiveness of *Eminoculus* and *Pseudosthenarus* suggests long isolation in South Africa.

b) A pattern of wider distribution is that of endemicity in the Southwest Cape but having strong affinities with the Drakensberg montane region and outlying Southwest Cape floral elements. Genera with this distribution are *Austropsallus*, *Coatonocapsus*, *Stoebea*, *Parapseudosthenarus*, the *Acrorrhinium brincki* group, *Zanchius* (except *Z. nigrolineatus*), and *Zanchiella*. These genera, in large part, show a strong association with the endemic flora of South Africa and particularly with elements of the Southwest Cape Flora (Figure

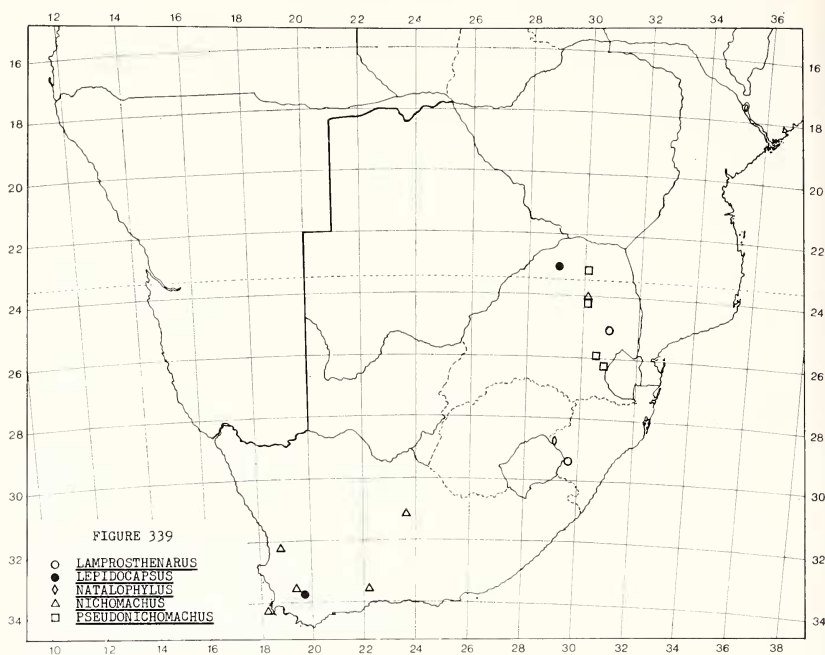


FIG. 339. Distribution of five genera of the Miridae in South Africa (see text for explanation).

338). The occurrence of *Zanchius buddleiae* in the central Transvaal is almost certainly the result of introduction of the host into the National Botanical Gardens in Pretoria. Although the distributions are not well known for all species, at least *Austropsallus drakensbergensis* is generally distributed in the northern Drakensberg, and further collecting will probably substantiate similar occurrences for other taxa. This is in marked contrast to both genera and species in "pattern a" which are not known to occur in the Drakensberg in Natal or the Transvaal. This agrees with many plants endemic to South Africa, where those in the Southwest Cape show very limited distributions and those of the Drakensberg and other outlying Cape Floral elements show much wider distributions.

Zanchius and *Zanchiella* (Figure 338) are related to *Felisacodes* (see pattern 2), but I have placed them here because they appear to have radiated in South Africa and are primarily restricted to the endemic flora.

Nichomachus and *Pseudonichomachus* (Figure 339) have been

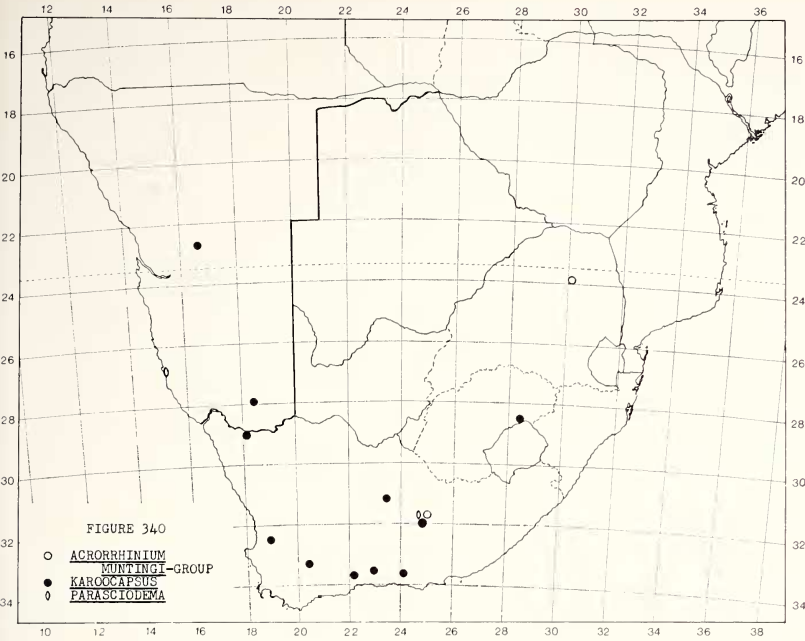


FIG. 340. Distribution of three genera of the Miridae in South Africa (see text for explanation).

collected from localities at relatively high elevations in the Transvaal where there are patches of Southwest Cape related vegetation. The species from the Cape Province are either from the Macchia region proper or from the Karoo.

Natalophylus is known from a single locality on the Drakensberg at about 6000 feet (1875 meters) (Figure 339). Its morphological specialization in the male genitalia relative to the related *Phylus* from Europe, suggests isolation and possible endemism in South Africa. This genus may be derived from a *Phylus*-like ancestor which arrived in South Africa from the north. The host genus *Heteromorpha* (Umbelliferae) is endemic to Africa (Phillips, 1951).

Lepidocapsus and *Lamprosthenarus* are known from the Southwest Cape and montane regions of South Africa, respectively (Figure 339). Both of these genera also occur in tropical Africa, but at the present time it is not possible to determine with which area they have their strongest affinities.

An additional genus which may have a "type b" distribution is

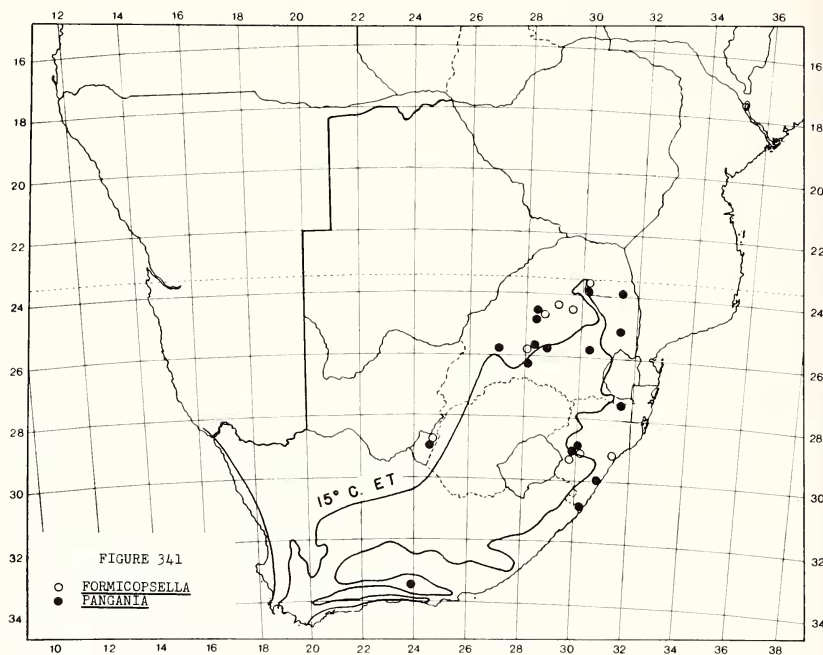


FIG. 341. Distribution of two genera of the Miridae in South Africa (see text for explanation).

Pseudambonea, which is known at present only from a single locality in the eastern Cape, north of Port Elizabeth.

c) A third endemic pattern includes Namaqualand, the Great Karoo, and the dry Southwest Cape (with possible strong affinities with the Little Karoo). Genera having this distribution are *Karoo-capsus*, *Parasciodema*, the *Acrorrhinium munting* group, and to some extent *Austropsallus* and *Coatonocapsus*. Figure 340 shows the distribution of these taxa; many of the species are currently known only from Grootfontein, Middelburg, Cape Province (Note: In several cases the same species taken at Middelburg are also recorded from Zomerkomst, Politzi, Transvaal. According to Acocks (1951), the vegetation of these areas is unrelated. The latter localities may be in error.). The only close relatives of *Karoo-capsus* are from Australia, which indicates that this unique South African genus is probably a relict.

Namaquacapsus from Namaqualand (Figure 345) possibly has this type of distribution. It shows great morphological specialization,

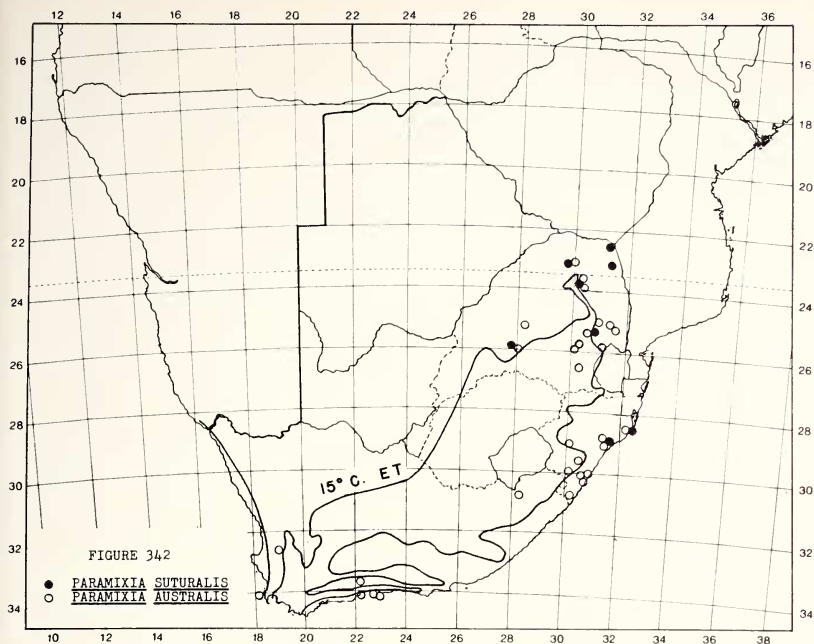


FIG. 342. Distribution of two species of the Miridae in South Africa (see text for explanation).

particularly in the type of vestiture. The distribution of the Halticini, to which *Namaquacapsus* belongs, is however primarily Mediterranean and therefore it is discussed under "pattern 4".

2) A pattern showing primarily tropical affinities in South Africa and more or less confined to an area delimited by the 15° ET isoline includes *Cyrtorhinus*, *Formicopsella*, *Hallodapus*, *Lasiolabopella*, *Macrotylus niger*, *Odhamboella*, *Pangania*, *Paramixia*, *Pseudoloxops*, *Trichophorella*, *Trichophthalmocapsus*, and *Tytthus*. These genera constitute 23% of the South African fauna. Most of the taxa with this distributional pattern belong to tropical African and paleotropical faunal elements and show greater diversity in tropical Africa than in South Africa (see Figure 343).

Pangania fasciatipennis and *Formicopsella regneri* present well documented examples of this type of distribution (Figure 341). Both species are apparently associated with *Acacia*, particularly *A. karroo*. The distribution of these two mirid species is well defined by the 15° ET isoline despite the wider distribution of their host,

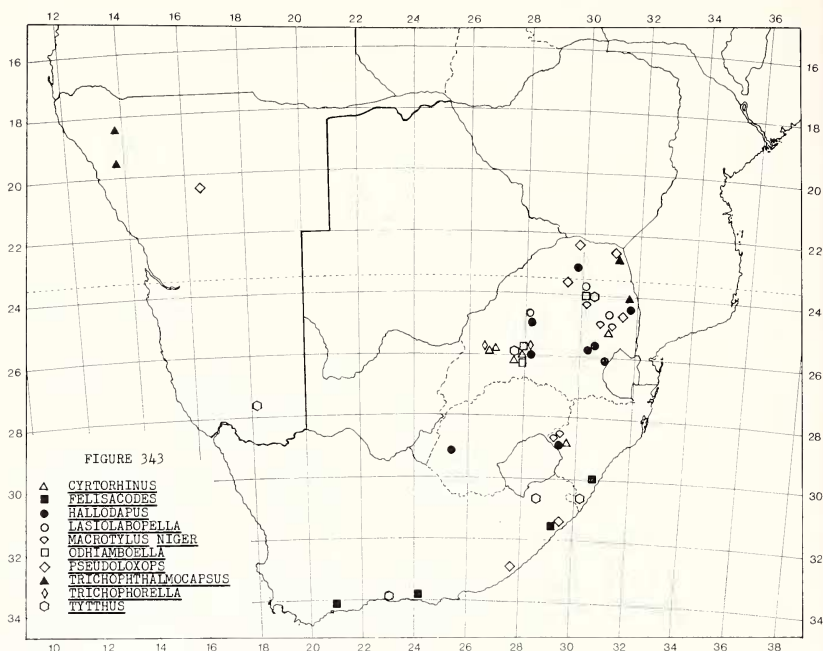


FIG. 343. Distribution of nine genera and one species of the Miridae in South Africa (see text for explanation).

especially in the highveld of the Transvaal and the Orange Free State. The one record of *Pangania* from the Southwest Cape, from the Little Karoo at Nooitgedacht near Oudtshoorn, corresponds with the 15° ET isoline and also with the distribution of *Acacia* in that area. Both of these species come to light and are relatively easily collected. The known distribution is therefore probably relatively accurate, although they will most likely be found in much of South Africa that is as yet very poorly collected. *Paramixia* has a similar distribution (Figure 342), although here one species is more strictly tropical than another, but nonetheless the 15° ET isoline defines well the distribution of the genus within South Africa.

Felisacodes has what is apparently a "forest relict" distribution (Figure 343). It is known from Chirinda, Rhodesia, and Mt. d'Ambre, Madagascar, as well as South Africa.

3) A pattern of wide distribution within South Africa, and in some cases involving East Africa, includes *Systellonotus* and *Ellenia*. These two genera constitute 4% of the fauna.

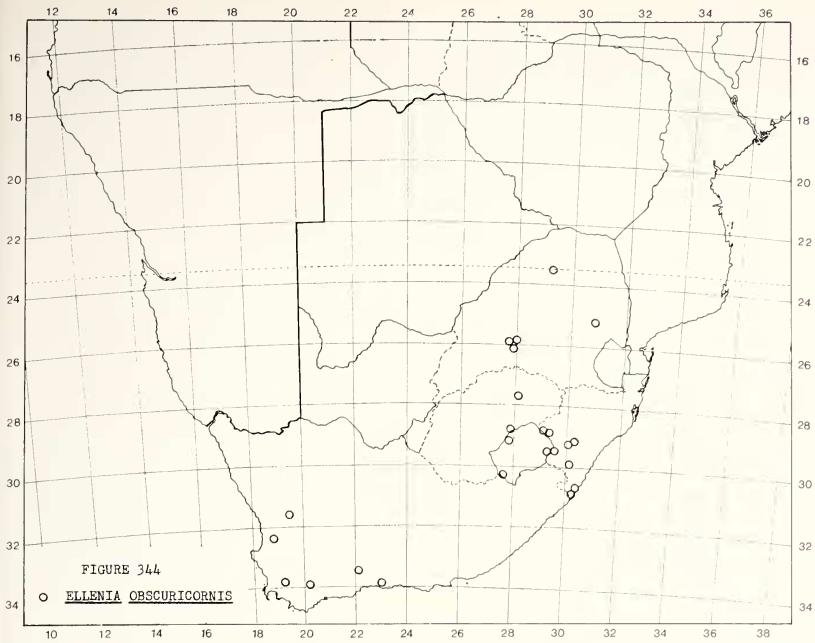


FIG. 344. Distribution of a species of the Miridae in South Africa (see text for explanation).

Systellonotus is chiefly Mediterranean in distribution. In South Africa it is not restricted to the area of Mediterranean climate but is widely distributed, being known from Natal, the Orange Free State, and South West Africa (Figure 345). This may represent a disjunct Mediterranean distribution, but the widespread occurrence of the genus in South Africa suggests that it may eventually be found in East Africa as well.

Ellenia obscuricornis is widely distributed in South Africa and East Africa (Figure 344); however, in South Africa it does not occur in tropical localities, such as the low veld in the Transvaal and the Natal tropical corridor. There is some indication that *Ellenia*, in South Africa, may be more or less restricted to *Senecio*, a very diverse and widely distributed genus. The absence of *Ellenia* from tropical South Africa, even though it occurs in East Africa, is not readily explicable.

4) A pattern of distribution associated with very dry areas and possibly showing some endemism in South West Africa includes

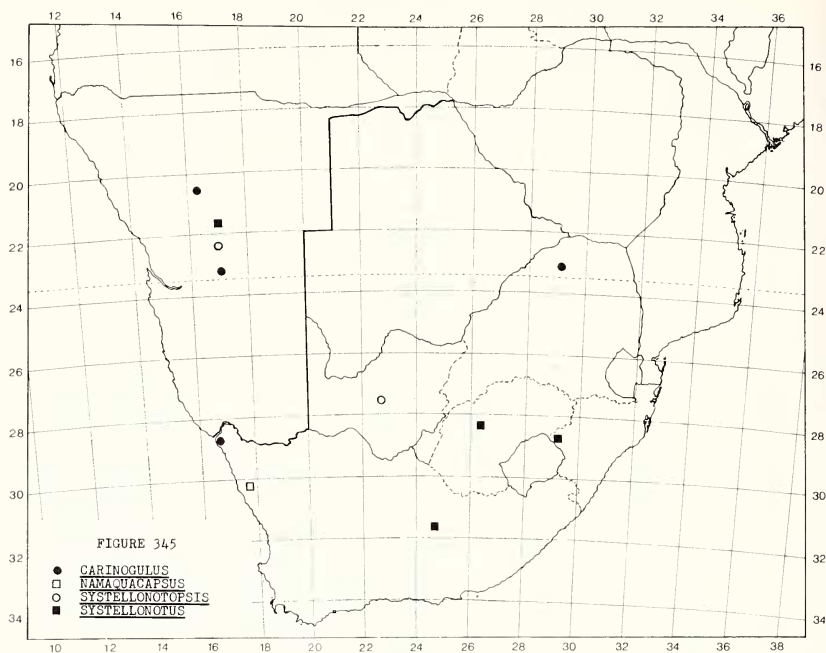


FIG. 345. Distribution of four genera of the Miridae in South Africa (see text for explanation).

Carinogulius, *Namaquacapsus*, and *Systellonotopsis*, which constitute 6% of the fauna. Both *Carinogulius* and *Namaquacapsus* show relationships with groups that occur primarily in the Horn of Africa or the Mediterranean. There are many examples of groups whose distributions show close affinities between these areas (van Zinderen Bakker, 1969; Moreau, 1966). *Systellonotopsis* is probably endemic to the dry areas of southern Africa, but its relationship to other groups is too poorly understood to speculate on the possible significance of its distribution (see Figure 345).

5) About 15% of the South African genera have a strictly tropical distribution roughly delimited by the 16° ET isoline. They are *Azizus*, *Halticus*, *Myombea*, *Nanniella*, *Pilophorus*, *Plagiognathidea*, *Pseudopilophorus*, and *Skukuza*. These genera are all restricted to the Mozambique coastal plain and to the Natal tropical corridor (Figure 346). They primarily belong to the tropical African element, but *Pilophorus* and *Halticus* are cosmopolitan.

Macrotylus hemizygiae and *Zanchius nigrolineatus* may also be

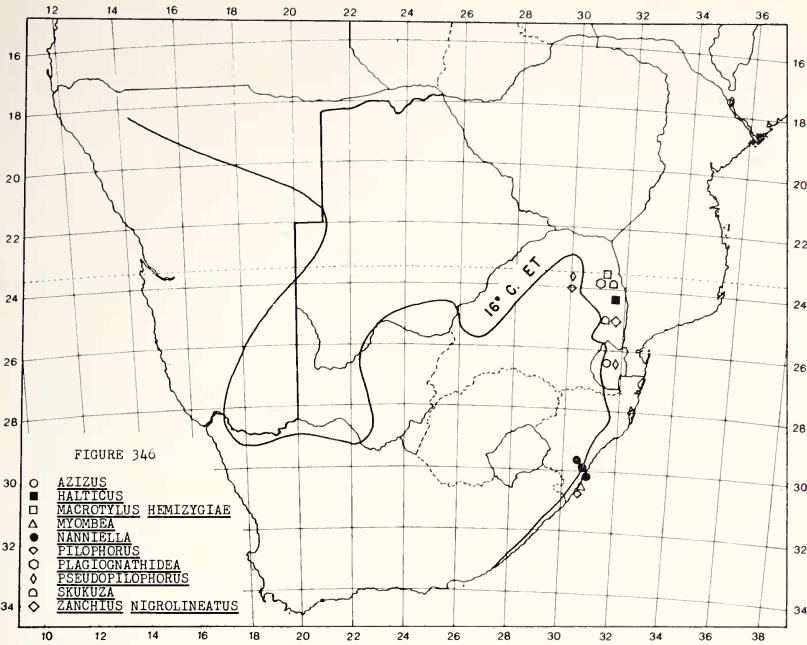


FIG. 346. Distribution of eight genera and two species of the Miridae in South Africa (see text for explanation).

species with tropical affinities (Figure 346). They are presently known only from the Kruger National Park. Other South African members of these two genera have distributions that are not strictly tropical, as discussed above.

Five genera, or 9% of the known fauna of South Africa, were not analyzed in the foregoing discussion. These include *Brachycranella*, *Sthenarus-Campylomma*, *Leptoxanthus*, *Psallus*, and *Orthotylus*.

My inability to identify specimens of *Brachycranella* and *Leptoxanthus* makes it impossible to discuss their distributions at the present time. Both genera are known only from South West Africa.

The *Sthenarus-Campylomma* group is represented in South Africa by approximately eight species. These are known primarily from the area with the more tropical fauna rather than from the areas of extreme endemism. This distribution is in agreement with that of *Campylomma* and *Sthenarus* as a whole, which are rather widely distributed in the Old World with only one introduced species of *Campylomma* presently recorded from the New World (Knight, 1941).

Approximately 10 *Psallus*-like species are present in collections from South Africa. They are known from all areas of the country. The extremely complex taxonomic problems involved with this genus make it impossible to determine at present the possible affinities of the South African fauna.

Orthotylus in South Africa presents an even more complex picture than *Psallus*. *Orthotylus* is currently recorded from all zoogeographic regions except South America. There are about 20 species occurring in South Africa, but they cannot be related to the faunas of other areas at present because of the paucity of knowledge on the genus as a whole except for those of the Palearctic.

PART 2. A PHYLOGENETIC ANALYSIS OF THE ANTMIMETIC TRIBES OF THE ORTHOTYLINAE AND PHYLINAE FOR THE WORLD

HISTORY OF THE CLASSIFICATION OF THE MIRIDAE

The phylogeny of the Miridae has not received great attention since the exhaustive treatments of Reuter (1905a; 1910a). Van Duzee (1916), Knight (1923; 1941) and Carvalho (1952a) have reviewed or revised the classification; Slater (1950) and Kelton (1959b) examined the female and male genitalia, respectively, and made many valuable suggestions relative to the classification and phylogeny of the family; and, Wagner (1955) and Leston (1961) presented phylogenetic analyses of the Miridae with useful discussions, but unfortunately their works were based almost solely on Palearctic genera.

Distant (1904c: 412–413) stated: “. . . at present the classification of the family is more reflective of personal opinion, and contrived for purposes of entomological arrangement, than exhibiting an evolutionary or philosophical conception. The Capsidae are a very difficult group to study, their affinities are of the most difficult description, and for the present we must be satisfied with a somewhat artificial or cabinet arrangement.” Distant went on to say that he did not understand the system of Reuter and therefore did not follow it. This statement by Distant precipitated Reuter's (1905a) publication of the polemical “Hemipterologische Spekulationen. I. Die Classification der Capsiden” in which he accused Distant of making only superficial observations on the Miridae and therefore producing results of little or no value. Most mirid taxonomists since Reuter have more or less adopted his excellent classification. Even the

world classification of Carvalho (1952a) added little new morphological information to that which Reuter (1905a; 1910a) presented.

Reuter (1905a) included a dendrogram with his phylogeny of the Miridae. He considered the absence of a pronotal collar to be primitive. Reuter therefore placed the "Isometopidae," which possess ocelli, but lack a pronotal collar, at the very base of his phylogenetic tree and grouped the Plagiognatharia, Oncotylaria, etc. (Phylinae) and the Cyllocoraria, Laboparia, etc. (Orthotylineae) together on one side of the dendrogram with the Phylinae nearer the base because of the hair-like parempodia (considered to be "poorly developed arolia" by Reuter). He derived the Dicypharia (Dicyphinae) and Cylaparia and Fulvaria (Cylapinae) from near the Orthotylineae. Reuter considered the Bryocoraria (Bryocorinae) and Clivenemaria (Deraeocorinae) to be somewhat isolated but relatively closely related to one another and placed them by themselves near the base of the tree. He placed the Miraria, Capsaria, etc. (Mirinae) at the top of the dendrogram above the Orthotylineae. Reuter (1910a), in his later work, did not give a phyletic dendrogram for the Miridae but presented a scheme of classification similar to that discussed above. In this paper he grouped the Miridae into subfamilies whereas in the previous paper he recognized only divisions (tribes).

Knight (1923; 1941) obviously modified his own dendrogram from that of Reuter but gave little supporting discussion regarding subfamily relationships. Both Reuter and Knight considered the Phylinae to be among the most primitive members of the Miridae, whereas I consider them to be among the most highly derived (see below).

Wagner (1955) considered the Orthotylineae-type of male genitalia to be primitive in the family. He presented the Bryocorinae, Cylapinae, Pilophorini-Phylinae, and Halticini-Mirinae-Dicyphinae-Deraeocorinae, in that order, as separate evolutionary lines branching off the main orthotyline stem at successively higher levels. This scheme was based on the male genitalia and did not take into account the parempodia, pulvilli, or pronotal collar, all of which would have to be evolved more than once to correspond with Wagner's interpretation of the evolution of the male genitalia. Wagner considered the Orthotylineae and Phylinae to be closely related but also derived the Mirinae, Dicyphinae, Deraeocorinae, and Halticini in a single line of evolution from the main Orthotylineae stem. If the Orthotylineae male genitalia are considered as derived a much more parsimonious system can be devised.

Leston (1961) presented a phylogenetic scheme based primarily

on the genitalic studies of Slater (1950) and Kelton (1959b) and on his own work on chromosomes, testis follicle numbers, and wing venation. He considered the Isometopinae to be the most primitive subfamily in the Miridae with the Bryocorinae somewhat more advanced, but still near the base of the mirid stem. Leston (1961) proposed a relationship between the Deraeocorinae and Mirinae and also a possible link between the Cylapinae and Deraeocorinae. He considered the Orthotylinae, Phylinae, and Dicyphinae to be the most advanced groups in the Miridae.

ANALYSIS OF CHARACTERS AND A REVISED CLASSIFICATION

Reuter (1910a) used the parempodia as the primary characters in the classification of the Miridae and was followed by Carvalho (1952a). Both authors recognized three basic types of parempodia and considered them more or less invariable. I have also found that the parempodia are extremely valuable in the classification of the Miridae; however, some confusing variation exists in the different types, a situation which was first recognized by Wagner (1955). By interpretation of this variation and correlation with other characters, particularly those of the genitalia, the parempodia can be used to establish some primary divisions within the family. Kullenberg (1947b) raised the most serious doubts about the value of the parempodia in the classification of the Miridae, suggesting that they are highly adaptive. The previous studies of Reuter (1910a) and Knight (1922; 1923) and the subsequent work of Carvalho (1952a) and Wagner (1952; 1955) and this study all show, however, that the parempodia are the most useful single character in the classification of the family.

The other characters which are of greatest value in the systematics of the Miridae are the male and female genitalia, pronotal collar, wing dimorphism, pulvilli, feeding habits, presence or absence of ocelli, number of tarsal segments, ant-mimetic appearance, and possibly chromosome numbers and testis follicle numbers. Additional characters such as body form, punctuation, pubescence, length of tarsal segments, and number of cells in the membrane are also important, but usually useful only below the subfamily and tribal levels. My use of characters in classifying the Miridae is more or less in agreement with previous authors except for differences in interpretation and increased emphasis on the male and female genitalia. In addition to the parempodia, Reuter (1905a; 1910a) used the structure of the pronotum, including the collar, tarsi, membrane

cell, hamus, prosternal xyphus, and lora in his classification. Knight (1923) considered the parempodia, genitalia, biology, and modifications of the thorax, in that order, to be of greatest importance in studying relationships within the family. I have not included the hamus, prosternal xyphus, or lora in developing the following classification of the Miridae, as I have found these structures to be of more limited value than the others listed above.

The genitalia have received only limited acceptance in the study of mirid phylogeny. The attitude of many workers is typified by Carvalho (1952a: 34) ". . . the claws and arolia are still the best characters to be used in the subdivision of the family into subfamilies and tribes. . . . The genitalia alone have been found to be misleading in many respects and their acceptance as a primary character would certainly cause some changes in the present classification."

The first author to use the male genitalia in the separation of mirid species was Reuter in 1883 (Kelton, 1959b). Knight (1941) emphasized that the vesica in the Phylinae was a fundamental character in classification. Wagner (1955) was the first author to use the male genitalia as an integrated unit in the classification of the family. The most comprehensive review of mirid male genitalia is that of Kelton (1959b); he suggested needed changes in the classification based on the vesica, but did not make them. I use the male genitalia extensively, including characters of the claspers, vesica, and phallosome.

Mirid female genitalia received very little attention until the studies of Kullenberg (1947a) and Slater (1950). The former author was concerned primarily with the functional aspects of the morphology. Slater, however, examined them from the point of view of higher classification and laid the groundwork for subsequent studies. Wagner (1956) was the first author to base taxonomic changes in the Miridae on the structure of the female genitalia. I use the structure of the posterior wall primarily, and the sclerotized rings secondarily, in the classification of the family.

The possible value of wing dimorphism in classifying the Miridae was first alluded to by Reuter (1910a), but it has been used very little. In many Hemiptera (vis., Lygaeidae, semiaquatic families) reduction of the hemelytra occurs with more or less equal frequency in both sexes. In the Miridae two types of wing dimorphism exist, suggesting two independent mechanisms to account for the expression of the phenomenon. The Stenodemini and Halticini show the nonsex related type of wing dimorphism mentioned above. In the Phylinae and some Orthotylineae, however, wing dimorphism is almost always

sex related, the females being brachypterous, when short winged forms exist, and the males always being macropterous. A similar situation is thought to exist in the Schizopteridae (Emsley, 1969). Brinkhurst (1959) has established the mechanisms for determination of hemelytral types in the Gerridae, but this is not known for the Miridae. Presumably the mechanism of determination in the Stenodemini is hormonal and environmentally induced (Southwood, 1962), but in the Phylinae it is probably genetic.

Southwood (1962) and Sweet (1964) have proposed that brachyptery in the Hemiptera is a development related to environmental stability. This probably applies to the Phylinae (and other groups with a similar type of wing dimorphism), with the male as the active agent of genetic interchange between populations. The females are only very rarely macropterous and therefore contribute less to gene flow between populations than the males (see Brinkhurst, 1963). The retention of the female in the habitat of the host must confer a selective advantage. In the Halodapini (and some Leucophoropterini, Orthotylini, and Nichomachini) an additional selective advantage may be conferred on the females in that they are generally much more ant-like than the males.

Carvalho (1952a) used ant-mimetic appearance as a primary character in the classification of the Miridae. An important aspect of this study has been to assess the value of mimicry in analyzing the phylogeny of the family. Within limits I have found that mimetic appearance is very useful, particularly at the tribal level (e.g. Halodapini). In some cases, however, higher taxa cannot be defined on mimetic facies. Kelton (1959b) for the Mirinae, and other workers, have emphasized this point. In all groups where ant-mimics exist, they certainly represent a derived condition. However, in many cases (e.g. the Pilophorini) mimetic genera retain primitive characters. The morphological modifications most commonly found in the ant-mimetic Miridae are: the presence of one or more light hemelytral maculae or fasciae that contrast with the dark background coloration of the forewings and body; the sinuation of the lateral hemelytral margins; and the constriction of the pronotum anteriorly, with the tendency toward the development of a flattened pronotal collar. Certain tribes in the Phylinae and Deraeocorinae have the pronotum constricted anteriorly and bearing two erect, cone-like structures dorsally. This structural modification also occurs in the genus *Saldoida* (Saldidae). Some genera (as yet undescribed) have the pronotum constricted medially so as to form an hour-glass shape. In certain undescribed genera in the Pilophorini and Leucophoropterini the

TABLE 1
Comparison of Nabidae and Miridae
(p—primitive; d—derived)

CHARACTER	NABIDAE	MIRIDAE
Feeding habits	predaceous (p)	primarily phytophagous (d)
Male genitalia (symmetry)	nearly symmet- rical (p)	strongly asymmet- rical (d)
Male genitalia (vesica)	membranous (p)	membranous or sclerotized (p—d)
Female genitalia (posterior wall)	poorly developed (p)	usually well devel- oped (d)
Female genitalia (sclerotized rings)	poorly developed (p)	usually well devel- oped (d)
Cuneus	absent (p)	present (d)
Ocelli	present (p)	usually absent (d)
Pronotal collar	present or absent (p—d)	present or absent (p—d)
Parempodia	hair-like (p)	hair-like or fleshy (p—d)

gula is carinate below the eye and gives the appearance of mandibles when viewed anteriorly. All of these structural characteristics have evolved more than once and are therefore indicative of the extreme adaptability of the Miridae to ant-mimic selection. The obvious convergence of several groups toward certain common mimetic facies for the most part precludes the definition of higher taxa within the Miridae on the basis of ant-like appearance alone.

The zoogeography of the Miridae has never been analyzed or used as a tool in the classification of the family. With the Carvalho Catalogue as a source of information the assessment of distributional patterns becomes much easier than before and the study of the phylogeny of the family can be greatly enhanced, a position in opposition to that taken by Leston (1961). In this study I have not been able to consider the distributions of all subfamilies of Miridae in detail. The distributional patterns of the Orthotylineae and Phylinae, however, suggest that zoogeographic analyses within the family, especially at the tribal level, are very useful in understanding the evolution of the Miridae.

Additional characters I have used in developing this classification are discussed below under the individual taxa.

TABLE 2
Comparison of subfamilies of Miridae
(p—primitive; d—derived)

	PRONOTAL COLLAR	VESICA	POSTERIOR WALL	SCLEROTIZED RINGS	NUMBER OF TARSAL SEGMENTS
ISOMETOPINAE	absent (d)	membranous (p)	well devel- oped (d)	well devel- oped (d)	2 (d)
CYLAPINE	present or absent (p-d)	membranous (p)	well devel- oped (d)	well devel- oped (d)	3 or 2 (p-d)
BRYOCORINAE	present (p)	membranous (p)	poorly devel- oped (p?)	poorly devel- oped (p?)	3 (p)
DICYPINAE	present (p)	membranous (p)	well devel- oped (d)	well devel- oped (d)	3 (p)
MIRINAE	present (p)	membranous (p-d)	well devel- oped (d)	well devel- oped (d)	3 (p)
DERAEOCORINAE	present (p)	membranous (p-d)	well devel- oped (d)	well devel- oped (d)	3 (p)
ORTHOTYLINAE	usually ab- sent (d)	usually mem- branous (p)	well devel- oped (d)	well devel- oped (d)	3 (p)
PHYLINAE	absent (d)	sclerotized (d)	well devel- oped (d)	well devel- oped (d)	3 (p)

TABLE 2 (continued)

	FEEDING HABITS	OCELLI	PAREMPODIA	PULVILLI (OCCURRENCE)	PULVILLI (POSITION)
ISOMETOPINAE	predatory (p)	present (p)	hair-like (p)	absent (p)	—
CYLAPINAE	predatory (p)	absent (d)	hair-like (p)	absent (p)	—
BRYOCORINAE	phytophagous (d)	absent (d)	hair-like (p)	present (d)	inner surface of claw
DICYPHINAE	predatory & phytophagous (p - d)	absent (d)	hair-like (d)	present (d)	inner surface of claw
MIRINAE	generally phy- tophagous (d)	absent (d)	fleshy, di- vergent (d)	present (d)	ventral surface of claw
DERAEOCORINAE	predatory (d)	absent (d)	hair-like (d)	absent (d)	—
ORTHOTYLINAE	mixed diet (p - d)	absent (d)	fleshy, con- vergent (d)	present (d)	ventral surface of claw
PHYLINAE	mixed diet (p - d)	absent (d)	fleshy & conver- gent or hair- like (p - d)	present (d)	ventral surface of claw

In a phylogenetic or cladistic classification it is necessary to designate given states of a character as relatively primitive (plesiomorphic; ancestral) or derived (apomorphic) and monophyletic groups must be recognized only on the possession of shared derived characters (Hennig, 1966). The taxonomy of the Miridae is still so poorly known that it is difficult to determine for most characters what is the primitive and what is the derived state. By examining families related to the Miridae some comparative data can be assembled. Table 1 lists characters in the Nabidae and Miridae.

The Nabidae have the greatest number of what are probably plesiomorphic characters in the Cimicoidea, including predatory feeding habits, ocelli, presence of a pronotal collar, membranous vesica, nearly symmetrical male genitalia, and absence of pulvilli. The Anthocoridae and Miridae, which are derived relative to the Nabidae, have in common the cuneus and therefore form a natural group within the Cimicoidea; however, these two families represent individually specialized lines of evolution. The Anthocoridae are entirely predatory, retain ocelli, and show a trend toward development of the highly specialized method of traumatic insemination. The Miridae, with the exception of the Isometopinae, have lost the ocelli, have a tendency toward phytophagy, and have specialized genitalia, although along a much different line than found in the Anthocoridae.

Table 2 lists the subfamilies of Miridae and a number of characters that are important in the classification of the family. I am following Carayon (1958) and including the Isometopinae in the Miridae.

If the individual mirid subfamilies are compared with the Nabidae, which seems justified, it appears that the Isometopinae possess the greatest number of plesiomorphic characters, namely the presence of ocelli, predatory feeding habits, and the absence of pulvilli. The Cylapinae also appear relatively primitive in that they are predaceous, possess a pronotal collar, and lack pulvilli. The view that these groups are not secondarily predaceous is supported by the uniformity of feeding habits within each subfamily. Support for the predatory nature of the ancestral cimicoid stock can be found in the fact that the Nabidae, Microphysidae, Vellopedidae, and Anthocoridae and also Reduviidae (which are most closely related to the Cimicoidea [Cobben, 1968]), are all predatory. Only the Tingidae, Thaumastocoridae and Miridae are phytophagous. In that the Miridae are specialized within the Cimicoidea, lacking ocelli (except Isometopinae) and possessing a cuneus and specialized male and female

genitalia, it is probable that the predaceous habit is ancestral within the family and that phytophagy is a derived condition. The feeding habits of the Miridae are, however, rather poorly understood. Many groups may be secondarily predaceous and some are probably oligophagous.

The rounded pronotal collar is probably plesiomorphic in the Miridae, an hypothesis supported by the occurrence of the structure in most subfamilies, including the Cylapinae, Bryocorinae, Dicyphinae, Mirinae, and Deraeocorinae. It also occurs in the prostemmine Nabidae (although not in the Nabinae) and in the Anthocoridae, both of which possess a greater number of plesiomorphic characters than do the Miridae. The rounded pronotal collar is absent in the Isometopinae, Orthotylinae, and Phylinae, but this can probably best be attributed to secondary loss. If the rounded collar is considered to be derived in the Miridae it must be evolved independently at least 4 times, whereas it is only necessary that it be lost twice when it is considered to be plesiomorphic.

The genus *Psallops* Usinger should be considered here. Usinger (1946) placed this genus in the Phylinae, but subsequent examination of the male genitalia by Carvalho (1956b) revealed that *Psallops* is not a phyle, but has a membranous vesica more similar to all other Miridae than to the Phylinae. Carvalho (1956b) felt that someday *Psallops* would be placed in the Isometopinae, even though it does not possess ocelli. *Psallops* is in actuality probably most closely related to the Cylapinae. I have examined the female genitalia of an undescribed species of *Psallops* from South Africa. It has well developed sclerotized rings and a simple, sclerotized, plate-like posterior wall. Neither of these structures is highly specialized, but both are relatively primitive and similar to those found in the Cylapinae (personal investigation) and Isometopinae (Slater and Schuh, 1969). *Psallops* has only two tarsal segments. This condition is the rule in the Isometopinae, and also occurs in a few genera placed in other mirid subfamilies, including *Vannius* Distant and *Peritropis* Uhler in the Cylapinae and *Hemisphaerodella* Reuter in the Bryocorinae. The 2-segmented condition is almost certainly not ancestral in that the remainder of the Miridae, the Nabidae, and the Anthocoridae all have 3-segmented tarsi. Bergroth (1925) has noted that 2-segmented tarsi occur sporadically throughout the Heteroptera, and that those groups that possess them cannot be considered connecting links to other such groups. J. A. Slater (personal communication) has suggested that they possibly represent a neotenic condition, because of the nymphs of the Geocorisae which

all have 2-segmented tarsi. The Isometopinae and Cylapinae therefore cannot be related by the similar tarsal structure of some genera. *Psallops* also has only one membrane cell, a condition found in most, but not all Isometopinae (Bergroth, 1925), and lacks a pronotal collar, a structure which is also absent in all Isometopinae but present in most Cylapinae. *Psallops* looks much like many Isometopinae (see *Isometopidea*, in Slater and Schuh, 1969). This complex of characters suggests, but in no way confirms, a relationship between the Isometopinae and Cylapinae and may distinguish them as relatively primitive within the Miridae although they both possess many derived characters.

The Dicyphinae have a rounded pronotal collar, a simple posterior wall in the female and a membranous vesica in the male, all of which are probably plesiomorphic characters and occur in varying combinations in other mirid subfamilies. Cobben (1968) has suggested a relationship between the Dicyphinae and the *Helopeltis* group (Monalionini) of the Bryocorinae based on the structure of the eggs. The pulvilli of the Dicyphinae also relate them to the Bryocorinae. They are leaf-like and attached to the inner surface of the claw, whereas in all other Miridae, the pulvilli are minute and always attached to the ventral surface of the claw.¹

The male and female genitalia of the Bryocorinae appear to be the most primitive in the Miridae although the condition may be secondarily derived (Kullenberg, 1947b). In this subfamily the phallus is very simple and in this sense resembles that of *Nabis*; it may not be divided into a vesica and conjunctiva as in other mirids (Kullenberg, 1947b). Also the posterior wall and ring glands of the female are very poorly developed in some tribes (Slater, 1950), as in *Nabis* (Kullenberg, 1947a), but more highly developed in others (see Schmitz, 1968). The Bryocorinae and most Isometopinae have only one membrane cell, whereas the rest of the Miridae have two, which also suggests a derived condition (see Leston, 1961). The genus *Bunsua* Carvalho, from Africa, which was originally placed in the Orthothylinae, is closely related to the Bryocorinae, and may have some characters which are intermediate between the Bryocorinae and other members of the Miridae, although there is no direct relationship to the Orthothylinae.

¹ Carvalho (1952a) considered the pulvilli of the Phylinae (including Dicyphinae) to arise from the "base or inner surface of the claw" and those of the Bryocorinae to arise from the ventral surface of the claw. I have interpreted the Phylinae-type to arise from the ventral surface of the claw and the Bryocorinae-type (including Dicyphinae) from the inner surface.

The question of the monophyletic nature of the Bryocorinae and the relationship of the Dicyphinae to the Monalioniini needs careful investigation.

The Deraeocorinae lack pulvilli and have a rounded pronotal collar, both plesiomorphic conditions in the Miridae. They are, however, highly specialized in several respects and therefore are discussed below in relation to the Mirinae.

The Mirinae, Orthotylinae, and Phylinae all possess modified fleshy parempodia and pulvilli that are attached to the ventral surface of the claws. They therefore form a group within the Miridae. Leston (1961) considered this structural similarity to be a convergence.

The Mirinae possess several derived characters. The vesica of the male is of a highly developed membranous type similar to that found in the Deraeocorinae (Kelton, 1959b). The posterior wall and sclerotized rings are specialized but do not show an extremely close relationship to other subfamilies in the Miridae (Slater, 1950). This subfamily has a rounded pronotal collar which I consider to be an ancestral condition relative to the Orthotylinae and Phylinae, both of which lack a collar. The Stenodemini do not have a collar, except for the genus *Collaria* Provancher. Knight (1941) felt that the Stenodemini were probably primitive because of their host plants (grasses) and distribution. I disagree with Knight on morphological grounds and consider the pronotal type in the Stenodemini to be derived. Also the grasses may not be so primitive as thought by Knight. Distant (1904c) considered the sulcation of the head in the Stenodemini to be of great importance, and assigned the group subfamily rank; he placed the Isometopinae in a second subfamily within the Miridae and lumped all of the remaining members of the family into a third subfamily. The monophyletic nature of the Mirinae is supported by the female genitalia (Slater, 1950) and the male genitalia (Kelton, 1959b).

The Deraeocorinae, although possessing hair-like parempodia and lacking pulvilli, both of which are probably plesiomorphic characters in the Miridae, also possess a number of derived characters and probably show their closest relationship to the Mirinae, and may be derived from them. The vesica in the Deraeocorinae is similar to that found in the Mirinae and occurs nowhere else in the Miridae (Kelton, 1959b). The posterior wall is a simple sclerotized plate, which probably represents the plesiomorphic condition in the Miridae, but in the Deraeocorinae, when considered in light of other characters possessed by the subfamily, may represent a secondarily simplified

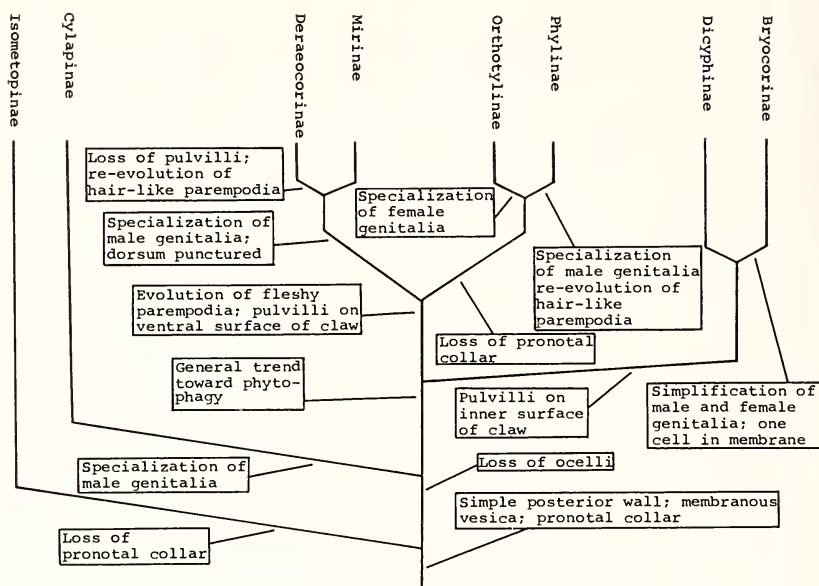


FIG. 347. Phylogeny of the Miridae.

condition (Slater, 1950). The general facies of the Deraeocorinae, particularly *Deraeocoris*, are very much like that of many Mirinae. The type of pronotal collar and the punctate dorsum are common to the two subfamilies; the latter character occurs only sporadically in all other mirids, but is relatively common in the Mirinae and almost universal in the Deraeocorinae. The Deraeocorinae are often very specialized predators, suggesting a specialization of feeding habits rather than what is probably a generalized predatory habit in many ground living Cylapinae (e.g. *Fulvius*). These facts then indicate secondary loss of the pulvilli, reevolution of the hair-like parempodia (see also Orthotylinae-Phylinae discussion), and simplification by reduction of the female genitalia in the Deraeocorinae from the type found in the Mirinae.

A number of characters suggest that the Orthotylinae and Phylinae are closely related. These include 1) the absence of a rounded pronotal collar (a derived character relative to other Miridae, although it is secondarily evolved at least once in both subfamilies); 2) the presence of recurved, convergent parempodia in the Orthotylinae and some Phylinae (Pilophorini); 3) the tendency for infolding of the lateral margins of the sclerotized rings in both sub-

families with a great accentuation of this condition in the Orthotylini; and 4) a tendency towards sclerotization of the vesica.

Figure 347 presents a possible evolutionary scheme for the Miridae. The Isometopinae probably diverged early as an isolated line which retained the ocelli. The Cylapinae also probably arose relatively early, in that they are predatory, primarily ground living, have relatively primitive male and female genitalia, lack pulvilli, and possess hair-like parempodia. The Cylapinae also possess several characters that are probably derived, including the form of the head, but none of these seems to relate them to other subfamilies.

The Dicyphinae and Bryocorinae (Monalionini) may be related as suggested by Cobben (1968). If these two groups were placed in a single subfamily they would still be related to the remaining members of the Bryocorinae through the Monalionini by the pretarsal structures and the single cell in the membrane (which also occurs in some Isometopinae, but this is probably a convergence [Leston, 1961]). The male and female genitalia of the Bryocorinae may appear primitive as a result of reduction (Kullenberg, 1947b; Slater, 1950). If they are considered as primitive within the Miridae as a whole, it necessitates the loss of the ocelli twice or reevolving the ocelli in the Isometopinae. I have therefore derived the Bryocorinae-Dicyphinae above the level of the Isometopinae but below the level of the remaining subfamilies, based primarily on the structure of the male and female genitalia in the Dicyphinae.

The Mirinae (including Deraeocorinae)-Orthotylinae-Phylinae line is probably the most advanced in the Miridae. The Mirinae are primarily phytophagous. The Deraeocorinae, although predatory, are often very highly specialized and in many cases resemble the Mirinae and are probably most closely related to them. I have therefore derived them from a common stem. The Orthotylinae and Phylinae are related to the Mirinae by the pretarsal structures but differ from them in lacking a rounded pronotal collar. They are related to one another by the structure of the parempodia, the male and female genitalia, the absence of a rounded pronotal collar, and possibly by their mixed feeding habits (Leston, 1961). The tremendous diversity in the Mirinae, Orthotylinae, and Phylinae in most zoogeographic regions suggests an active evolution with little extinction, and therefore probably an advanced position in the evolution of the family.

The subfamily Palauocorinae (Carvalho, 1956b) was not discussed above because so little is known about it. Erected for a single genus and species from Micronesia, this unique insular subfamily has many

specialized features, but may not deserve such high taxonomic rank. It is probably specialized through great isolation in an island environment. Further information will be necessary to determine the correct placement for this taxon within the Miridae.

THE RELATIONSHIPS OF THE ORTHOTYLINEAE AND PHYLINEAE

Three types of parempodia exist within the Orthotylineae and Phylinae: 1) distinctly fleshy, convergent apically, recurved (lyre-shaped), and flattened laterally; 2) hair-like and parallel; and 3) fleshy, rod-like, of nearly uniform diameter, and weakly convergent apically. Types 1 and 3 were placed together as a single type in the Reuter and Carvalho systems of classification. Knight (1923) realized that there was classificatory confusion in groups with convergent parempodia and made some generic changes, but it was Wagner (1961) who first pointed out the distinctive nature of types 1 and 3. Excellent figures of all three types of parempodia are available in the current literature (see Carvalho, 1955a; Knight, 1923, 1941, 1968; Wagner, 1961).

All genera of Orthotylineae and Phylinae with parempodia types 2 and 3 have male genitalia of the phylinae-type, i.e., with a rigid, sclerotized vesica and characteristic left clasper and phallosome. Miridae with type 1 parempodia have two types of male genitalia—most genera have a membranous vesica, which may or may not possess sclerotized spiculi (orthotyline-type); a much smaller number has the phylinae-type.

The phylinae-type male genitalia are structurally distinct from all others found in the Miridae. They also possess a unique and complex functional relationship. It is almost inconceivable that such a combination of structure and function could have evolved independently more than once and therefore all taxa possessing it must be placed in a single, derived group. The phylinae-type of male genitalia probably evolved from the less specialized orthotyline-type (Singh-Pruthi, 1925) which resembles that of the other subfamilies of mirids more closely than it does the phylinae-type. Since type 1 recurved convergent parempodia occur in taxa with and without phylinae-type male genitalia, it seems logical to believe that of the parempodial types discussed above, type 1 is the ancestral condition and types 2 and 3 represent derived states which arose from ancestors with type 1 parempodia and phylinae-type male genitalia.

All previous authors have defined the Orthotylineae as those Miridae with apically convergent parempodia. As can be seen from the

above discussion, this definition does not recognize the different types of convergent parempodia (types 1 and 3) and therefore brings together mirids with two types of male genitalia. Because the phylinae-type male genitalia are derived, all of those genera possessing them must be placed in one higher category to form a monophyletic group. I am therefore redefining the Orthotylinae to include only those genera with type 1 parempodia and orthotyline-type male genitalia. This definition excludes the Pilophorini, which were placed in the Orthotylinae by all previous authors, and also several genera which have type 3 parempodia; all of these excluded taxa belong to the Phylinae. As redefined, the Phylinae now include all genera with the derived phylinae-type of male genitalia but with all three types of parempodia discussed above.

SUBFAMILY ORTHOTYLINAE

DIAGNOSIS: Facies, coloration, and vestiture variable; sometimes ant mimetic; females occasionally and males less often brachypterous; pronotum sometimes with a flattened or rounded collar; parempodia fleshy, convergent apically, recurved (lyre-shaped), and flattened laterally; pulvilli minute, attached to ventral surface of claws; vesica membranous, inflatable to at least a limited degree, sometimes with long sclerotized spiculi apically; phallosome fixed to phallobase, claspers variable, left usually larger than right; female with posterior wall varying from a simple sclerotized plate to a highly modified form with K-structures (Figure 109); sclerotized rings ranging from nearly flat to highly infolded on lateral margins.

DISCUSSION: All Orthotylinae have apically convergent, recurved parempodia. The male genitalia have a membranous vesica with or without sclerotized spiculi. The claspers show some tribal characters, but in general the male genitalia are not indicative of distinct phyletic trends within the subfamily.

The female genitalia in the Orthotylinae present a somewhat different evolutionary picture than those of the male and are very useful in recognizing phyletic lines within the subfamily. There are two basic types: 1) those with the posterior wall usually relatively simple and plate-like and with the sclerotized rings varying from flat to somewhat upturned laterally; and 2) those with a highly specialized posterior wall possessing K-structures and with the sclerotized rings strongly upturned laterally.

The simple plate-like posterior wall (type 1 above) probably represents the plesiomorphic condition in the Miridae because it is present in some of the Orthotylinae and in at least five other sub-

TABLE 3
Characters used in tribal classification of Orthotylinae

CHARACTER	PRIMITIVE	DERIVED
Parempodia fleshy, convergent apically, recurved	all genera	_____
Posterior wall	without K-structures: Halticini, Nichomachini	with K-structures: Orthotylini
Vesica	membranous: Halticini, Nichomachini	often with sclerotized spiculi: Orthotylini
Pronotal collar	absent: many Orthotylini	present: <i>Falconia</i> , <i>Nanniella</i>
Lateral corial margin	convex or straight: most genera	sinuate: Nichomachini, <i>Pseudopilophorus</i> , <i>Sericophanes</i> -group
Punctations on dorsum	absent in most genera	present: <i>Nanniella</i> , <i>Falconia</i>
Body form	robust: most genera	very elongate: <i>Aetorrhinella</i> , <i>Felisacodes</i>
Vestiture	setiform hairs: most genera	scale-like hairs: <i>Melanotrichus</i>
Wing dimorphism	both sexes macrop- terous: most Orthotylini	females brachyp- terous: <i>Serico- phanes</i> , <i>Nichomachus</i> ; both sexes brachyp- terous: many Halti- cini, <i>Laurinia</i>

families. The posterior wall with K-structures is without question a derived condition as it occurs in only a limited group of mirids (Orthotylini), all of which possess type 1 parempodia. The Pilo-phorini, which I am placing in the Phylinae (see above and also tribal discussion), have type 1 parempodia which relate them to the Orthotylinae; they also have a relatively simple posterior wall, as in some Orthotylinae, but have highly specialized male genitalia. Therefore, the ancestral orthotyline stock must have had a simple posterior wall and type 1 parempodia. The Phylinae must have diverged from this line relatively early and the posterior wall became specialized within the Orthotylinae subsequently.

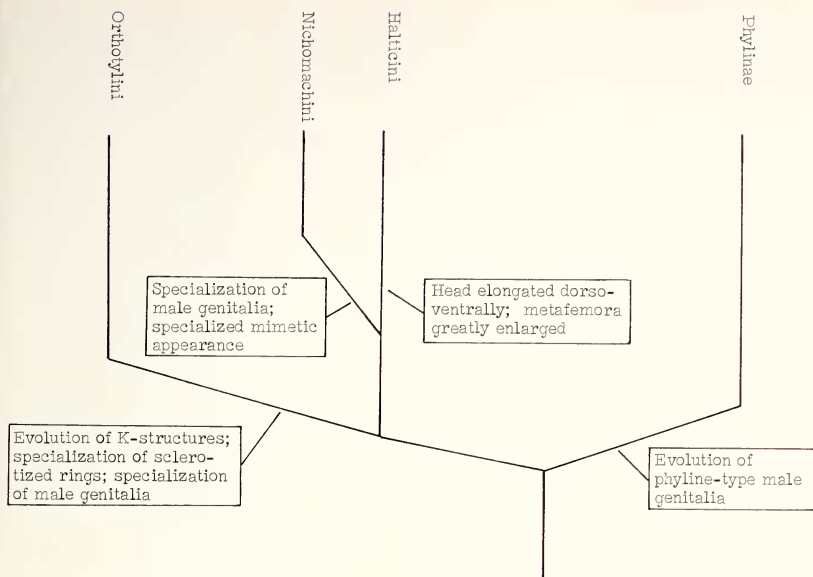


FIG. 348. Phylogeny of the Orthotylinae.

Variation in the posterior wall in the Orthotylinae is greater than in the remainder of the Miridae. The great dissimilarity in type of female genitalia in those mirids with type 1 parempodia, particularly in the structure of the posterior wall, suggests that a case can be made for placing the genera with K-structures (Orthotylini) in a distinct subfamily apart from the remaining genera. Based on the stability of the parempodia and male genitalia, however, I prefer to treat the Orthotylinae as a monophyletic group of subfamilial rank.

I recognize three tribes within the Orthotylinae—Halticini, Nichomachini, and Orthotylini. All of the Nichomachini and some Halticini and Orthotylini are ant mimetic.

Table 3 lists characters important in the tribal classification of the Orthotylinae. They are categorized as primitive and derived. Where a character state has evolved independently more than once, several unrelated genera that possess the character are noted. A proposed phylogeny of the subfamily is given in Figure 348.

ZOOGEOGRAPHY: The Orthotylinae appear to be nearly cosmopolitan in distribution in the Carvalho system of classification. With the revised tribal classification presented below, certain definite dis-

tributional patterns emerge. The removal of the Pilophorini to the Phylinae is significant in this respect.

The most distinctive feature of the zoogeography of the Orthotylineae is the preponderance of advanced genera (Orthotylini) in the New World, including nearly all of the ant-mimetic genera in the subfamily (Figure 349c). A much smaller number of advanced orthotylines occurs in the Old World, but the relatively primitive groups in the subfamily (Halticini and Nichomachini) are virtually restricted to the Eastern Hemisphere. Australia has a number of rather interesting genera, the most notable of which is *Myrmecoroides* Gross, 1963, which by virtue of its bizarre morphology, especially of the head, shows a probable long isolation in Australia. When better known *Myrmecoroides* will probably be placed in a new tribe. The occurrence of *Myrmecoroides* and other isolated genera in Australia indicates that that faunal region may be of particular interest in understanding the evolution of the Orthotylineae.

TRIBE HALTICINI

DIAGNOSIS: Usually black or dark colored, sometimes with lighter markings; body usually robust, sometimes elongate; dorsum usually smooth, often polished and shining, seldom with heavy punctures; vestiture variable, occasionally dense and very long; head usually dorsoventrally elongated, height of gena greater than height of eye; pronotum and scutellum seldom highly modified (except in *Myrmecophyes*); often brachypterous (sometimes males as well as females); metafemora often greatly enlarged; vesica membranous, without spiculi; left clasper usually elongate with small hook apically; right clasper flattened and expanded apically, usually spoon-shaped or club-shaped; posterior wall of female without K-structures, although sometimes specialized (*Labops*); sclerotized rings variable; other structural features as in Orthotylineae.

DISCUSSION: The most useful structures for recognizing the Halticini are: 1) the recurved convergent parempodia; 2) an apically enlarged right clasper; 3) a posterior wall lacking K-structures; 4) the elongated genae; and 5) the enlarged metafemora. Although the Halticini are often difficult to separate from the Orthotylini on external characters, the posterior wall will always distinguish the two groups (Wagner, 1956), as will usually the right clasper. Reuter (1910a) and Carvalho (1952a) did not include these genital characters in their definition of the tribe and consequently certain genera were either incorrectly excluded from (e.g. *Myrmecophyes*) or included in (e.g. *Slaterocoris* Wagner) the Halticini.

Much recent discussion has centered around the possible phyletic character of the Orthotylinae and particularly the Halticini (Slater, 1950; Leston, 1961). The variability of the posterior wall has been the major cause for this concern. I consider the relative uniformity of the head, with its elongate genae, and the peculiar club-shaped right clasper as apomorphic characters that bind the Halticini together. The posterior wall can be viewed as an inherently variable structure within the Halticini which gave rise to the highly derived K-structures in the Orthotylini.

The Halticini are morphologically somewhat isolated in the Orthotylinae with their peculiar head structure, greatly enlarged metafemora, and generally jet black coloration. Even though they possess these specialized features, they are probably still primitive within the subfamily as judged primarily on the simplicity of the posterior wall and sclerotized rings in most genera. The Halticini are most closely related to the Nichomachini, which have a simple posterior wall (Figure 98), but very peculiar sclerotized rings (Figure 99). The ancestral stock of the tribe probably originated early in the evolution of the Orthotylinae and became specialized subsequently.

Only the genus *Myrmecophyes* Fieber is ant mimetic.

ZOOGEOGRAPHY: The Halticini are most diverse in the Palearctic (Figure 349a), particularly in the Mediterranean region, but lack of modern generic definitions may misrepresent the actual number of genera involved. The cosmopolitan *Halticus* occurs in both tropical and temperate regions, including areas of high rainfall, and is the only genus that is widespread. Most other halticines are adapted to areas of Mediterranean climate which are relatively dry. The tribe is not well represented in many areas of the world with a Mediterranean climate, which suggests low dispersal ability and limited adaptability or possible replacement by more advanced groups.

DISCUSSION OF INDIVIDUAL GENERA.

Myrmecophyes Fieber, 1870.

Carvalho (1952a; 1958b) placed *Myrmecophyes* in the Pilo-phorini because of its ant-mimetic facies and convergent parempodia. Wagner (1952; 1955) recognized the halticine character of the head and male genitalia and moved the genus to the Halticini. Approximately 16 species are described, primarily from the Eastern Mediterranean.

* *Strongylocoris* Blanchard, 1840 (in part), see *Slaterocoris* Wagner (Orthotylini).

NICHOMACHINI, NEW TRIBE

DIAGNOSIS: Ant mimetic; dark colored; males usually macropterous, elongate with very slender abdomen, in brachypterous forms abdomen similar to females; hemelytra with two or three partial, light, transverse fasciae; females brachypterous, abdomen strongly constricted basally and swollen medially, hemelytra greatly reduced, covering only two basal abdominal segments; head nearly vertical, concave behind, including eyes, posterior margin of vertex usually carinate; antennal segments 3 and 4 equal to or slightly greater in diameter than segment 2; pronotum usually with distinct anterior and posterior lobes or with anterior lobe only poorly differentiated, posterior lobe in macropterous forms tumid; scutellum elevated, bluntly conical or only convex; hemelytra in macropterous forms exceeding apex of abdomen; lateral corial margins weakly to rather strongly sinuate; membrane with two cells; vesica membranous (Figure 94) or with sclerotized bands (see Wagner, 1957b); left clasper with spine-like group of stiff hairs on basal lobe, shaft slender, apex barbed (Figure 95); right clasper greatly reduced; posterior wall of female simple, lacking K-structures (Figure 98); sclerotized rings very small, contorted (Figure 99).

DISCUSSION: The African genera *Nichomachus* Distant, *Pseudonichomachus* Schuh, and *Laurinia* Reuter, form a distinct group, based on the structure of the claspers, the simple posterior wall, the peculiar sclerotized rings, general mimetic facies, and profound sexual dimorphism. I am therefore placing them in a new tribe. *Eucampsella* Poppius and *Kuomocoris* Odhiambo, both from Madagascar, probably belong in the Nichomachini, but the genitalia have not been examined for either genus.

Wagner (1957b) placed *Laurinia* in the Orthotylini because of the parempodial structure and the form of the male genitalia; he related the genus to *Globiceps* LePeletier and Serville. Additional characters provided by examination of the female genitalia of *Nichomachus*, viz., the simple posterior wall and the very small, anomalous sclerotized rings, do not confirm this relationship, because *Globiceps* is a typical member of the Orthotylini and has well developed K-structures.

The Nichomachini are probably most closely related to the Halticini, where the posterior wall also lacks K-structures and is generally much simpler than in the Orthotylini (although see Slater, 1950; Wagner, 1955, 1956). The male genitalia of the Nichomachini can be derived from those of the Halticini, and are a specialization of the

halticine-type. The right clasper in the Nichomachini is greatly reduced, a situation found in very few Orthotylinæ. The Nichomachini have become very highly specialized in many features but represent an old (and possibly relict) stock within the Orthotylinæ that diverged from the main line of evolution before the development of K-structures.

ZOOGEOGRAPHY: At present the Nichomachini are known only from the Ethiopian Region, including Africa and Madagascar (Figure 349b). Their greatest diversity is in South Africa. All known species are ground living and probably adapted to dry areas.

DISCUSSION OF INDIVIDUAL GENERA.

Eucompsella Poppius, 1914a.

Eucompsella is related to the Nichomachini by 1) the structure of the pulvilli; 2) the structure of the head and pronotum; 3) the number of hemelytral fasciae; and 4) the distribution. Poppius (1914a) stated that he examined three male specimens of *Eucompsella elegantula* Poppius and that they were deposited in the Paris Museum. I was unable to locate these specimens in Paris, but at least one is in the Helsinki Museum and I am designating it as the lectotype of the species. It bears the following labels: "Museum Paris, Madagascar, Tananarive, Coll. Noualhier 1898"; "*Eucompsella elegantula* n. gen. et sp., B. Poppius det."; "Mus. Zool. H: fors, Spec. typ. No. 7777, *Eucompsella elegantula* Popp."; and "LECTO-TYPE, *Eucompsella elegantula* Poppius, det R. T. Schuh". Poppius' (1921) dorsal view drawing is not accurate (see also discussion under *Kuomocoris*).

Kuomocoris Odhiambo, 1967, pp. 1683-1687.

Kuomocoris was placed in the Pilophorini with considerable reservation by Odhiambo (1967). He noted that the male genitalia were not phyline, but did not illustrate or describe them. After examining the holotypes of *K. rabalus* Odhiambo and *K. rubellus* Odhiambo, I believe they are closely related to the Nichomachini. This placement is strengthened by the structure of the head, pronotum, and hemelytra, including the transverse fasciae, the narrow, basally constricted abdomen, and the form of the parempodia. The scutellum is only convex and not conical as in *Nichomachus* and *Pseudonichomachus*. The male genitalia are missing from the holotype of *K. rubellus* and those of *K. rabalus* have not been dissected. *Kuomocoris* is known only from Madagascar and is very closely related to *Eucompsella*.

Laurinia Reuter, 1884.

Carvalho (1952a) placed *Laurinia* Reuter in the Herdoniini (Mirinae) and *Formicocoris* Lindberg in the Pilophorini (Orthotylinae). Lindberg (1956) synonymized the two genera. Wagner (1957b) reviewed the systematic position of *Laurinia* and on the structure of the parempodia and male genitalia related it to *Globiceps* in the Orthotylini. The male and female genitalia in the Nichomachini are unique and do not show the close relationship to the Orthotylini that was suggested by Wagner (1957b).

Only a single species is presently included in *Laurinia*, *L. fugax* Reuter, from North Africa (see Wagner, 1957b).

Nichomachus Distant, 1904a, see page 29.

Pseudonichomachus Schuh, new genus, see page 35.

TRIBE ORTHOTYLINI

DIAGNOSIS: Facies, coloration, and vestiture variable; sometimes ant mimetic; females occasionally brachypterous; dorsum seldom punctured heavily; pronotum occasionally with flattened collar, less often with rounded collar; cuneal fracture very rarely absent (*Sulamita* Kirkaldy); male genitalia with an inflatable membranous vesica, with or without long sclerotized spiculi; left clasper usually larger than right; female genitalia with K-structures (Figure 109); lateral margins of sclerotized rings usually strongly infolded (Figure 112); other structural features as in Orthotylinae.

DISCUSSION: The single most distinctive feature uniting the Orthotylini is the presence of K-structures on the posterior wall of the female genitalia. The strong infolding of the lateral margins of the sclerotized rings is also useful, but this condition occurs in an almost equally advanced state of development in some Phylinae. Characters helpful in separating generic groups within the tribe are: 1) the presence or absence of spiculi on the vesica; 2) the presence or absence of a pronotal collar; 3) the ant-mimic facies; 4) the length of the ovipositor; 5) the presence or absence of punctation on the dorsum; and 6) the hyaline or opaque hemelytra. The variability of all of these characters is very poorly understood. Therefore, a generic revision of the tribe including the use of those characters listed above, as well as a search for new characters, is badly needed. This becomes obvious in the following generic group analysis.

There have probably been several independent evolutions of ant mimicry within the Orthotylini, but the phenomenon is still very

poorly understood from a phylogenetic viewpoint, primarily because of the lack of material from the New World tropics where the greatest number of Orthotylini ant-mimic genera occur. The *Sericophanes* group (see below) is the only evolutionary line in the tribe in which all members are ant mimetic.

The Orthotylus group. This group, the largest in the Orthotylini, includes genera that can be most easily distinguished by well developed, long, heavily sclerotized spiculi on the vesica. Other characters, including the claspers, labial length, pubescence, and color, are all extremely variable. Most of the genera have an *Orthotylus*-type facies, but a few, primarily from the Palearctic, are ant mimetic. Included genera are (genera in parentheses have not been dissected, but appear very close to genera that have been): *Aetorhinella* Noualhier, *Aserymus* Distant, *Bifidungulus* Knight, *Blepharidopterous* Kolenati, *Brachynotocoris* Reuter, *Canariocoris* Lindberg, *Cyllecoris* Hahn, *Cyrtorhinus* Fieber, *Cyrtotylus* Bergroth, *Diaphnidia* Kelton, *Dryophilocoris* Reuter, *Erythrocorista* Lindberg, *Excentricus* Reuter, *Ficinus* Distant, *Fieberocapsus* Carvalho and Southwood, *Globiceps* LePeletier and Serville, *Hadronema* Uhler, *Heterocordylus* Fieber, *Heterotoma* LePeletier and Serville, *Hyoidea* Reuter, *Ilnacora* Reuter, *Ilnacorella* Knight, (*Kalanina* Kirkaldy), (*Kamehameha* Kirkaldy), (*Koanoa* Kirkaldy), *Labopidea* Uhler, *Lopidea* Uhler, *Maraudauda* Distant, *Mecomma* Fieber, *Orthotylus* Fieber, *Pachylops* Fieber, *Parthenicus* Reuter, *Platycranus* Fieber, *Pseudambonea* Schuh, *Pseudoclerada* Kirkaldy, *Pseudoloxops* Kirkaldy, *Pseudopilophorus* Schuh, *Pseudopsallus* Van Duzee, *Reuteria* Puton, and (*Thermus* Distant).

A number of tribes have been proposed for groups of genera that I am including in the *Orthotylus* group. The most important from a phylogenetic viewpoint are discussed below.

Zimmerman (1948) proposed the tribe Pseudocleradini for the endemic Hawaiian genus *Pseudoclerada*. Although *Pseudoclerada* has a peculiar facies, the male and female genitalia are clearly of the type found in the *Orthotylus* group. This superficially unique island genus certainly represents only a morphologically specialized segment of the main Orthotylini stem. Although the head and body shape are unlike that of most other members of the tribe, but resemble closely the predatory lygaeid *Clerada*, the K-structures of the female and the vesical spiculi relate *Pseudoclerada* closely to *Orthotylus* and its congeners. *Pseudoclerada* is very similar to *Maraudauda* from the Seychelles, and may be closely related to it.

Zimmerman (1948) also proposed the tribe Kalaniini for the

endemic Hawaiian genus *Kalania*. He placed it in the Bryocorinae. I have followed Carvalho (1952a) in considering *Kalania* an orthotylinae. Examination of the type female suggests that the morphological attributes of *Kalania hawaiiensis* Kirkaldy, the only species in the genus, are the result of extreme isolation in the Hawaiian Islands and that the genus is certainly derived from the main Orthotylini stem.

Ant mimicry within the *Orthotylus* group is limited to a few genera, such as: *Cyllecoris*, *Dryophilocoris*, and *Globiceps* from the Palearctic; *Pseudoxenetes* from the Nearctic; *Ficinus* from Mexico; and *Pseudopilophorus* from South Africa. The disjunct distribution of these genera suggests multiple independent evolutions of ant mimicry, but verification of this must await a thorough morphological study of the *Orthotylus* group.

The Falconia group. This small assemblage of genera can be recognized by the rounded pronotal collar, heavily punctured dorsum, vesica without spiculi, and extremely short ovipositor. Included genera are: *Adfalconia* Carvalho, *Falconia* Distant, *Falconiodes* Reuter, and *Solanocoris* Carvalho from the Neotropical Region, and *Sulamita* from the Hawaiian Islands. It is probably most closely related to the *Zanchius* group, the most obvious difference being that all *Falconia* group genera are heavily punctured and those of the *Zanchius* group are not. *Sulamita* was placed in the tribe Sulamitini (Sulamitaria Kirkaldy) by Zimmerman (1948) in the subfamily Bryocorinae; Carvalho (1952a) later moved the genus to the Orthotylini. The basic structure of members of the genus is very similar to *Falconia*. I have dissected the females of both *Falconia* and *Sulamita* and confirmed the presence of K-structures. The cuneus is fused with the corium in *Sulamita*, a secondary development, which accentuates the coleopteroid appearance found in all members of the *Falconia* group.

The Zanchius group. Diagnostic features of the group are: 1) the flattened appearance; 2) the very delicate body structure; 3) the usually hyaline hemelytra; and 4) the vesica without spiculi. Included genera are: *Brasiliomiris* Carvalho, *Felisacodes* Bergroth, *Hyalochloria* Reuter, *Itacoris* Carvalho, *Jobertus* Distant, *Malacocoris* Fieber, *Parachius* Distant, *Paraproba* Distant, *Pliniella* Bergroth, *Zanchius* Poppius, and *Zanchiella* Schuh (also probably *Zonodorellus* Poppius and *Zonodoropsis* Poppius). The distribution of the *Zanchius* group is more or less pantropical with the greatest diversity occurring in the Neotropics. Generic limits appear to be

poorly understood. It is very difficult to find definitive characters on which to base genera, a situation which results mainly from the very delicate body structure and small size of the members of the group.

The Sericophanes group. This group forms the major ant-mimic complex within the Orthotylinæ. It can be recognized by the presence of a more or less well developed pronotal collar, at least some degree of ant resemblance (females often brachypterous and much more ant-like than macropterous males), spiculi usually absent from the vesica, and ordinarily some type of hemelytral maculae or fascia. Included genera are: *Borgmeierea* Carvalho, *Ceratocapsus* Reuter, *Eucerella* Poppius, *Hallodapoides* Carvalho, *Laemocoridea* Poppius, *Lepidotaenia* Poppius, *Pamilia* Uhler, *Pilophoropsis* Poppius, *Renodaeus* Distant, *Schaffneria* Knight, *Sericophanoides* Carvalho, *Sericophanes* Reuter, and *Tuxenella* Carvalho.

The genera *Ceratocapsus*, *Pamilia*, *Pilophoropsis*, and *Schaffneria*, were placed in the tribe Ceratocapsini by Knight (1968). Carvalho (1952a) placed *Ceratocapsus* and *Pamilia* in the Orthotylini and *Pilophoropsis* in the Pilophorini. Kelton (1959b) showed that *Ceratocapsus* lacks vesical spiculi and is therefore very similar to *Sericophanes*, which Carvalho (1952a) and Knight (1968) placed in the Pilophorini. Kelton (1959b) also showed that the vesica of *Pamilia* has spiculi and that it is therefore closely related to *Hadronema*, *Slaterocoris*, and other members of the *Orthotylus* group, and thus its resemblance to *Sericophanes* may be one of convergence. I have not examined the male genitalia of *Pilophoropsis* (and I have not seen *Schaffneria*), but externally *Pilophoropsis* appears very closely related to *Sericophanes*. The females of *Sericophanes* are brachypterous and ant-like whereas those of *Ceratocapsus* are macropterous and much less ant-like. The placement of *Pamilia* and *Ceratocapsus* in the Orthotylini by Carvalho (1952a) is evidence of the subjective character of tribes defined on ant-mimetic facies alone, because *Pamilia behrensi* Uhler (and certain *Ceratocapsus* species) are nearly as ant-like as some species of *Sericophanes*, which Carvalho (1952a) placed in the Pilophorini.

The type of ant mimicry found in the *Sericophanes* group is not as morphologically sophisticated as in many hallodapine genera (Phylinae), particularly in that no Orthotylini genera have the head convex behind (as in the *Formicopsella* group of the Hallodapini), but always concave and contiguous with the anterior margin of the pronotum. In some genera, e.g. *Renodaeus*, the general body form

is extremely similar to that of *Pilophorus*, showing a remarkable convergence between the Orthotylinae and Phylinae.

The *Sericophanes* group is the only unit in the Orthotylini which exhibits pronounced brachyptery similar to the type found in the Phylinae, where the males are always macropterous and the females brachypterous (if short winged individuals exist). Most genera are not well known, but in *Sericophanes*, for example, it appears that the females are always brachypterous and much more ant-like than the males.

This group is primarily Neotropical with a limited representation in the eastern and southwestern United States. Carvalho (1952a) synonymized *Xenofulvius* Bergroth from Luzon, Philippines, with *Ceratopsus*. This action needs verification as no others members of the group are known from outside the Western Hemisphere.

Genera placed in the Orthotylini by Carvalho and subsequent authors that I have not examined or for which adequate information is lacking to determine subfamily placement include: *Acroderhis* Bergroth, *Campylotropis* Reuter, *Composcytus* Reuter, *Cysteoracha* Kirkaldy, *Deleapidea* Knight, *Dichaetocoris* Knight, *Druthmarus* Distant, *Hadronemidea* Reuter, *Hyporhinocoris* Reuter, *Lopidella* Knight, *Macrotyloides* Van Duzee, *Melanostictus* Reuter, *Mesotropis* Reuter, *Noctuocoris* Knight, *Pseudoneoborus* Knight, *Rhinocapsidea* Reuter, *Squamocoris* Knight, *Sthenaridea* Reuter, and *Uleana* Carvalho.

ZOOGEOGRAPHY: The Orthotylini show a marked concentration in the New World (Figure 349c). The *Falconia* group and the *Sericophanes* group are primarily restricted to the neotropics. The *Zanichius* group is pantropical and widely distributed in the Pacific Islands, suggesting great dispersal ability. The *Orthotylus* group is the most generally distributed in the Orthotylini and it is also probably the least specialized morphologically.

Although the Orthotylini have radiated as ant mimics in the neotropics, and to a lesser extent in the Nearctic, mimetic forms are virtually absent in the Old World tropics. The opposite situation obtains in the Pilophorini (except for North America), Leucophoropterini, and Hallodapini, which are essentially absent from the New World, but diverse in the Old World. Based on the mimics in particular, it appears that the Orthotylini have undergone long isolation in the neotropics and that even though the tribe is represented in the Old World (primarily by nonmimetic forms) the earlier mimetic radiation of the Phylinae in the Old World precluded radiation of

the Orthotylini as ant mimics in the Eastern Hemisphere (see also discussion under Phylinae).

DISCUSSION OF INDIVIDUAL GENERA.

Many genera included in the Orthotylini by Carvalho do not belong there and must be moved to other tribes and subfamilies. Also many genera placed in the Pilophorini by Carvalho are correctly placed in the Orthotylini.

Borgmeierea Carvalho, 1956c, pp. 235–237.

When he described *Borgmeierea* from Natal, Brazil, Carvalho (1956c) related it to *Lepidotaenia*, *Renodaeus*, and *Pilophoropsis*. He placed the genus in the Pilophorini. Although Carvalho did not illustrate the genitalia, his dorsal view drawings indicate a relationship of *Borgmeierea* to *Sericophanes*, as well as to the above mentioned genera. The type of parempodia, general facies, and occurrence in South America strengthen the probable affinities of this genus even though the genitalic information is not available. Under my redefinition of the tribes of the Orthotylinae, *Borgmeierea* is a member of the Orthotylini. The genus is known only from a single species from Brazil.

* *Bunsua* Carvalho, 1951b, Bryocorinae, see misplaced genera.

Coriodromus Signoret, 1862.

This genus closely resembles *Nesidorchestes* Kirkaldy from Hawaii, which was placed in the Halticini by Carvalho (1952a). Study of the male and female genitalia is needed to determine of these two genera are closely related and to which tribe *Coriodromus* actually belongs. *Coriodromus* occurs only in the Southwest Pacific and Australia.

* *Ellenia* Reuter, 1910a, Phylini, see page 157.

Erythrocorista Lindberg, 1958, pp. 107–109.

Erythrocorista Lindberg was incorrectly placed in the Phylinae by Lindberg (1958). The parempodia are plainly fleshy, convergent, and recurved and the male genitalia are not of the phylinae-type but of the orthotyline-type. Lindberg (1958) designated *E. echii* Lindberg as the type species of the genus. I have examined specimens from the Helsinki Museum labeled as holotype (Type No. 11109) and allotype (Type No. 11110) of *echii*. Each pin bears three specimens with no indication as to which specimen is the type. It is therefore necessary to designate a lectotype. The situation is additionally

confused because the pin bearing the holotype label has two males and one female on it; Lindberg (1958) indicated that the holotype was a male. Therefore I have placed a male specimen with the original locality label of Lindberg, a "holotypus" label, and the identification label on a separate pin and labeled it "LECTOTYPE *Erythrocorista echii* Lindberg, det. R.T. Schuh" and relabeled the remaining specimens.

Eucerella Poppius, 1921.

The structure of the parempodia and its occurrence in South America strengthen the placement of this genus in the Orthotylini, rather than in the Pilophorini as by Carvalho (1952a). The structure of the head (concave behind), narrow flattened pronotal collar, and mimetic facies ally *Eucerella* at least provisionally, with the *Sericophanes* group. *Eucerella* is known only from Bolivia.

The holotype of *Eucerella hirtipes* Poppius, the only available specimen for the genus, is not in the Paris Museum, as stated by Poppius (1921), but in the Helsinki Museum (Type No. 7781).

Hallodapoides Carvalho, 1951a.

In his original description, Carvalho (1951a) referred *Hallodapoides* to the Pilophorini. Subsequently he moved it to the Hallo-dapini (Carvalho, 1958a), but gave no explanation for this action. Carvalho's (1951a) illustrations of the male genitalia indicate that *Hallodapoides* is most closely related to *Sericophanes* and allied genera. This relationship is confirmed by the structure of the parempodia, the general facies, and the distribution. *Hallodapoides* contains only a single species, *H. guaraniensis* Carvalho, from Paraguay.

* *Hypseloecus* Reuter, 1891, see Pilophorini.

* *Idiomiris* China, 1963, see genera *incertae sedis*.

Kirkaldyella Poppius, 1921.

I have examined the male genitalia and parempodia of *Kirkaldyella rugosa* Poppius, and place *Kirkaldyella* in the Orthotylini, based on these characters. Carvalho (1952a) considered the genus to be in the Pilophorini. The general appearance is not particularly ant-like.

A male of *K. rugosa* from Sydney, New South Wales, Australia, is deposited in the Helsinki Museum (Type No. 12106). Poppius (1921) indicated that there is also a male in the Hungarian Museum. This latter specimen will have to be examined before a lectotype can

be designated. I have also seen an undescribed species of *Kirkaldyella* from Borneo.

Laemocoridea Poppius, 1921.

Laemocoridea is most closely related to the *Sericophanes* group based on the flattened pronotal collar, male genitalia, and general facies. I have examined the holotype male of *L. quadrimaculata* Poppius, which is deposited in the Helsinki Museum (Type No. 7784), rather than in the Paris Museum, as indicated by Poppius (1921).

Lepidotaenia Poppius, 1921.

Lepidotaenia is probably most closely related to *Tuxenella*, based on the upturned, carinate anterior margin of the pronotum, and the male genitalia of *L. bergrothi* Poppius. This species has two transverse bands of lepidote hairs on the hemelytra, similar to the type found in *Pilophorus*. The pronotum in *bergrothi* is constricted medially, forming a distinct anterior and posterior lobe. Two species of *Lepidotaenia* are known from Bolivia.

I have examined the holotype male of *L. bergrothi*, which is deposited in the Helsinki Museum (Type No. 7779), rather than in the Paris Museum as stated by Poppius (1921).

* *Millerimiris* Carvalho, 1951b, see Phylini.

* *Nanniella* Reuter, 1904, Halticini, see page 28.

* *Orthotylellus* Knight, 1935, see *Paramixia* Reuter, Pilophorini, see page 210.

Pamilia Uhler, 1887, see discussion under *Sericophanes* group.

Five species of *Pamilia* are known from the eastern and southwestern United States.

* *Parasthenaridea* Miller, 1937, see Pilophorini.

Pilophoropsis Poppius, 1914c, see discussion under *Sericophanes* group.

Three species of *Pilophoropsis* are known from Arizona.

* *Platyscytus* Reuter, 1907a, see Phylini.

Pseudoxenetus Reuter, 1909.

The female genitalic studies of Slater (1950) and male genitalic studies of Kelton (1959b) correctly established the position of *Pseudoxenetus* in the Orthotylini, rather than in the Pilophorini, as

placed by Carvalho (1952a). Two species of *Pseudoxenetus* are known from the eastern United States.

Renodaeus Distant, 1893.

Although the general facies of *Renodaeus* are very much like those of *Pilophorus*, the male genitalia (see Carvalho and Becker, 1959) confirm that the genus belongs to the Orthotylini and is a member of the *Sericophanes* group. Three species are known from Texas, Guatemala, and Guyana.

Distant (1893) described *Renodaeus ficarius* from two female specimens. I have designated as the lectotype a specimen in the British Museum (Natural History) bearing the labels: "Cerro Zunil, 4-5,000 ft., Champion"; "sp. figured"; "*Renodaeus ficarius* Dist."; and "LECTOTYPE *Renodaeus ficarius* Distant, det. R.T. Schuh."

Schaffneria Knight, 1966, see discussion under *Sericophanes* group.

One species is known from Texas.

* *Semium* Reuter, 1876a, see Phylini.

Sericophanes Reuter, 1876a.

Kelton (1959b) confirmed the relationship of *Sericophanes* to the Orthotylinae on the basis of the male genitalia which he considered as related to *Ceratocapsus*. I have examined the female genitalia of *S. heidemanni* Poppus, which has well developed K-structures; therefore the genus must be placed in the Orthotylini (see also discussion under *Sericophanes* group). *Sericophanes* presently includes 20 species, all from the New World, and shows its greatest radiation in the tropics (Maldonado, 1970).

Sericophanoides Carvalho and Fonseca, 1965, pp. 53-57.

Although placed in the Pilophorini by Carvalho and Fonseca (1965), *Sericophanoides* is closely related to *Sericophanes* by the general facies, and the form of the male genitalia and belongs to the Orthotylini. Two species are known from South America.

Slaterocoris Wagner, 1956, pp. 277-281.

Primarily on characters of the female genitalia, Wagner (1956) recognized the distinctive nature of the North American species previously placed in *Strongylocoris*. He erected for them the new genus *Slaterocoris*, belonging to the Orthotylini. This was the first taxonomic use of the K-structure, the importance of which was pointed out by Slater (1950).

Sulamita Kirkaldy, 1902a, see *Falconia* group discussion.

Tuxenella Carvalho, 1952d.

Carvalho and Dutra (1959) illustrated the male genitalia of *Tuxenella* which confirm the placement of the genus in the Orthotylini, although Carvalho (1952a, etc.) placed the genus in the Pilophorini. This genus probably belongs to the *Sericophanes* group, but it does not have the well developed pronotal collar of most genera in that group and has a more complex vesica with spiculi. Nine species are known from Chile.

SUBFAMILY PHYLINAE

DIAGNOSIS: Facies, coloration, and vestiture variable; sometimes ant mimetic; males always macropterous, females often brachypterous; pronotum sometimes with a flattened collar; parempodia either 1) fleshy, convergent apically, recurved (lyre-shaped) and flattened laterally, 2) fleshy, rod-like, of nearly uniform diameter, and weakly convergent apically, or 3) hair-like and parallel; pulvilli usually minute, always attached to ventral surface of claw, sometimes enlarged and either attached only at base or over entire ventral surface of claw; male genitalia distinctive; vesica elongate, sclerotized, rigid (Figure 228); gonopore variable, phallosome not fixed to phallobase; left clasper always larger than right, trough-like and receiving apex of phallosome in repose (Figure 222); right clasper flattened, leaf-like (Figure 234); female genitalia with simple undifferentiated posterior wall, sometimes with posterior margin evaginated (Figure 316); sclerotized rings usually slightly to rather strongly infolded laterally.

DISCUSSION: Carvalho (1952a) defined the Phylinae as those mirids with hair-like parallel parempodia and with the pulvilli attached to the inner surface of the claws (see discussion on page 264). He recognized three tribes within the subfamily—Phylini, Hallopapini, and Dicyphini. Kelton (1959b) showed that on the basis of the male genitalia the Dicyphinae are unrelated to the Phylinae and that the Pilophorini are much more closely related to the Phylinae than to the Orthotylinae, where they were placed by Carvalho (1952a; 1958b).

The hair-like parempodia of the Phylinae are derived from the convergent parempodia of the Orthotylinae (see above). The parempodia of the Dicyphinae, although similar to those of the Phylinae, are of an independent origin and may be the ancestral type in the Miridae. This view is supported by the dicyphine male genitalia which have a membranous, inflatable vesica, more similar to

that of other mirids than to the Phylinae. Considering the Dicyphinae as closely related to the Phylinae requires the derivation of the dicyphine-type male genitalia from the phyline-type or vice versa. The former situation requires a reevolution of the generalized dicyphine-type from the highly specialized phyline-type; the latter requires the independent evolution of convergent recurved parempodia in both the Pilophorini and Orthotylinae *sensu novo* and the evolution of the phyline-type male genitalia from the dicyphine-type. Both of these alternatives are less parsimonious and require more unlikely evolutionary events than does acceptance of the dicyphine and phyline parempodia as independently evolved. Kelton (1959b) indicated no relationship between the Dicyphinae and Phylinae on the basis of the vesica, but proposed an affinity of the Dicyphinae with the Deraeocorinae and Cylapinae. Evidence of this relationship is further strengthened by the presence of a rounded pronotal collar (which is absent in the Phylinae) and hair-like parempodia; the Deraeocorinae and Cylapinae lack pulvilli, which the Dicyphinae have, however. Slater (1950) related the Dicyphinae to the Phylinae on the structure of the female genitalia. This relationship, however, is based on what I consider to be primitive characters, since the simple plate-like posterior wall of the Dicyphinae also occurs in the Isometopinae, Cylapinae, Deraeocorinae, and Phylinae. Therefore, the Dicyphinae are not closely related to the Phylinae and must be placed in a separate subfamily. This is the status given the group by Knight (1941; 1968) and other authors. The Dicyphinae are possibly related to the Monalioniini (Bryocorinae) as noted above.

The convergent recurved parempodia of the Pilophorini relate them to the Orthotylinae, but, as discussed above, the Pilophorini have the unique phyline-type male genitalia. I therefore place them in the Phylinae and consider them to be among the most primitive members of the subfamily. The female genitalia of the pilophorines are specialized relative to the rest of the Phylinae, an evolutionary event which must have taken place subsequent to the divergence of the nonpilophorine Phylinae.

The type 3 rod-like convergent parempodia (see above) have apparently evolved independently several times in the Phylinae and represent a specialized condition within the subfamily. The derived nature of the type 3 parempodia relative to type 2 (hair-like), can be established with some certainty because they occur in all tribes and often in genera that possess many derived characters. The type 2 parempodia could also be considered intermediate between types

TABLE 4
Characters used in tribal classification of Phylinae

CHARACTER	PRIMITIVE	DERIVED
Head behind	concave: all Pilo- phorini, most Leucophoropterini	convex: many Phylini, some Hallodapini
Antennae	segments 3 and 4 slender: most genera	segments 3 and 4 en- larged: some Hallo- dapini and Leuco- phoropterini
Labium	long: most genera	short: some genera in all tribes
Frons	with transverse rugosities: most genera	without transverse rugosities: some genera, all tribes
Eyes	glabrous: genera in all tribes	hairy: genera in all tribes
Anterior margin of pronotum	finely carinate: Phylini, Pilophor- ini, some Leuco- phoropterini	flattened collar: all Hallodapini, some Leucophoropterini
Pronotum	constricted ante- riorly: most genera in all tribes	hour-glass shaped: some genera in Pilophorini and Leucophoropterini
Scutellum	flat: all tribes except Hallodapini	protuberant or spini- form: some Hallo- dapini
Lateral corial margins	straight or convex: all Phylini, most Pilophorini, some Leucophoropterini	sinuate: most Hallo- dapini and Leuco- phoropterini, some Pilophorini
Wing dimorphism	both sexes macrop- terous: all(?) Pilo- phorini, most Phylini	females brachypter- ous: many Hallodap- ini and Leucophorop- terini, some Phylini
Vestiture	setiform hairs: all Hallodapini, some genera in all tribes	wooly or scale-like hairs: some Phylini, Leucophoropterini, and Pilophorini
Rows of minute tibial spines	present: most genera in all tribes	absent: some genera in all tribes
Length tarsal segment 1	shorter than seg- ments 2 and 3: nearly all genera	longer than segments 2 and 3: <i>Cremno- cephalus</i> and <i>Myrmicomimus</i>

TABLE 4 (continued)

CHARACTER	PRIMITIVE	DERIVED
Pulvilli	minute: most genera in all tribes	enlarged: <i>Macrotylus</i> , <i>Eminoculus</i> , <i>Coquil-</i> <i>lettia</i> , etc.
Parempodia	fleshy, convergent apically, recurved: Pilophorini	hair-like: most genera of Phylini, Hallodapini, and Leucophoropterini; sometimes weakly fleshy and conver- gent apically
Abdomen	broad: all Phylini, most Pilophorini	slender, constricted basally: most Hallo- dapini and Leuco- phoropterini
Vesica	U-shaped, not twisted: all Pilophorini, some Leucophorop- terini	S-shaped, twisted: some Leucophorop- terini, all Phylini and Hallodapini
Phallosome	straight, opening terminal: all Pilo- phorini except <i>Para-</i> <i>mixia</i>	L-shaped: all Leuco- phoropterini, Phy- lini, and Hallo- dapini
Posterior wall	simple plate, pos- terior margin not evaginated: all tribes except Pilophorini	simple plate, pos- terior margin evagi- nated: Pilophorini
Sclerotized rings	more or less ellip- tical: most genera in all tribes	shaped otherwise: <i>Acrorrhinium</i>

1 and 3, but this does not appear to be the case in the majority of the genera possessing them.

I am recognizing four tribes within the Phylinae—Pilophorini, Phylini, Leucophoropterini and Hallodapini. Some Pilophorini, and all Leucophoropterini and Hallodapini, are ant mimetic.

Table 4 lists characters that are important in the tribal classification of the Phylinae. For those characters in which the derived state has evolved more than once, several genera are listed. Figure 350 is a proposed phylogeny for the subfamily.

ZOOGEOGRAPHY: The most distinctive feature of the phylinae

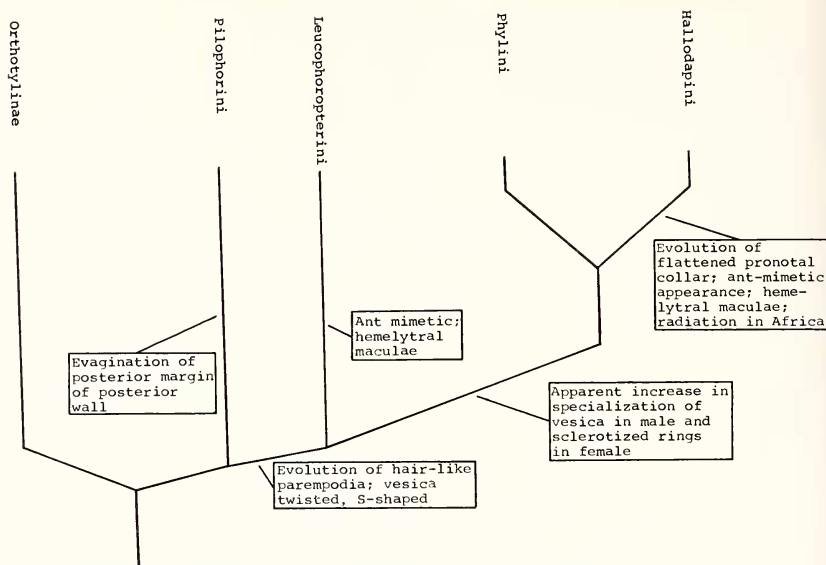


FIG. 350. Phylogeny of the Phylinae.

distribution is the concentration of tribes in the Old World (exclusive of Australia) (Figures 351a, b, c, and d). Of the four tribes, only the Phylini are at all well represented in the New World. The Hallodapini and Pilophorini are poorly represented (except for *Pilophorus*, which has speciated in the Nearctic) and the Leucophoropterini are absent from the Western Hemisphere. The Phylinae form a limited component of the ant-mimic mirid fauna in North America and are absent from the Neotropical Region, whereas they are the dominant mimetic mirids in the Old World. The Orthotylinae and Mirinae (Herdoniini) are the major mimetic mirid taxa in the New World.

The Phylinae appear to be extremely numerous and diverse in the Palearctic, but this may result from the advanced state of taxonomy in that region. In addition to being well collected and described, the Palearctic Phylinae are rather finely divided at the generic level, so that the actual number of genera might be somewhat reduced if the same generic concepts were applied in the Palearctic as currently exist in less well known regions.

The Phylinae are most diverse in temperate areas, including the Nearctic, Palearctic, and southern Africa, and much less so in tropical regions. This may be an adaptation to temperate floras, but

the evidence for this is not available. The pattern is particularly evident in the Phylini (Figure 351c), but is probably important in the Leucophoropterini also (Figure 351b). The Hallodapini and Pilophorini also have conspicuous temperate elements (see tribal discussions).

TRIBE HALLODAPINI

DIAGNOSIS: Ant mimetic; usually dark with contrasting light hemelytral maculae; pronotum always with well developed flattened collar (rounded in *Cremnocephalus* and *Myrmicomimus*); head usually convex behind, sometimes concave, eyes either contiguous with anterior margin of pronotum or removed from it by distance equal to nearly twice diameter of eye; pronotum always constricted anteriorly, sometimes forming a long neck; scutellum often tuberculate or occasionally spiniform; hemelytra either straight or sinuate laterally; abdomen usually constricted basally; parempodia hair-like, parallel (in *Cyrtopeltocoris* weakly fleshy and convergent apically); pulvilli usually minute, occasionally long and free or fused to claws; vesica always S-shaped or otherwise bent, sometimes very long (Figure 175); gonopore well developed, only rarely indistinct; left clasper always wedge shaped, trough-like; right clasper flattened and leaf-like; phallosome always L-shaped; posterior wall a simple plate, never with evaginated posterior margin.

DISCUSSION: The Hallodapini are the largest ant-mimic group in the Miridae, consisting of about 41 genera. The morphological adaptations of the Hallodapini for ant mimicry are unexcelled in the Miridae, and probably the Insecta, and are equalled in the Miridae only by the Leucophoropterini and Nichomachini. Wagner (1952; 1970b), and other authors have given the hallodapines subfamily rank, a position that has little merit, because it is based only on the superficial uniqueness of the group.

The Hallodapini (Systellonotini and *Cremnocephalaria* of older authors) have generally included all Phylinae that are ant mimetic, have a flattened pronotal collar, and usually have light maculae on the hemelytra. To this definition must be added characters of the male genitalia and distribution, otherwise genera belonging to the Leucophoropterini will be included in the tribe.

The Hallodapini as a tribe possess several characters that are derived relative to other members of the Phylinae and therefore appear to represent a monophyletic unit within the subfamily. These characters include: 1) the ant-mimic facies; 2) the flattened pronotal collar; 3) the hemelytral maculae; and 4) the structure of the male genitalia.

The strongest indication that the Hallodapini are monophyletic is found in the flattened pronotal collar. Although the rounded pronotal collar, as found in the Mirinae and other subfamilies, probably represents the ancestral condition in the Miridae, the flattened collar in the Hallodapini is almost certainly derived. This idea is supported by the fact that the Pilophorini, which are probably the most primitive members of the Phylinae, do not possess a pronotal collar. Also, the mode of evolution of the flattened collar from a pronotum with a finely carinate upturned anterior margin (as found in the Pilophorini, some Leucophoropterini, and most Phylini) can be traced in the Leucophoropterini (see tribal discussion), and suggests a possible mechanism for the evolution of the flattened collar in the Hallodapini from a more primitive phylina in which the anterior margin of the pronotum was finely carinate and upturned. The flattened collar is known to occur in only two genera of Phylinae in addition to the Hallodapini. They are *Eminoculus* from South Africa and an undescribed genus from Southeast Asia belonging to the Leucophoropterini; both of these taxa are specialized and, on the basis of additional derived characters, are more closely related to other evolutionary lines within the subfamily than to the Hallodapini.

All hallodapine genera either possess hemelytral maculae or are obviously related to genera that do. Although maculae have evolved more than once in the Phylinae, they are of very limited occurrence outside the Hallodapini and Leucophoropterini (occurring, e.g. in *Auchenocrepis* in the Phylini; in *Pilophorus* in the Pilophorini a transverse fascia is formed by sericeous scale-like hairs), and those non-hallodapine stocks that possess them are related to other evolutionary lines in the subfamily by additional derived characters.

The male genitalia of the Hallodapini are very similar structurally to those of the Phylini and much less so to those of the Pilophorini and Leucophoropterini. The tribe retains its monophyletic unity when the male genitalia are considered in conjunction with the pronotal collar and hemelytral maculae.

As outlined below, several lines of evolution can be traced in the Hallodapini. Each of the generic groups shows a strong affinity with at least one other generic group within the tribe, and thus all genera can be related to one another through other genera. The geographic distribution of the Hallodapini also strengthens the argument for a monophyletic tribe, with the greatest diversity in Africa and the Palearctic and with only limited but obviously related elements occurring in Southeast Asia and North America.

The phylogenetic affinities of the Hallodapini within the Phylinae

are obscure because no intermediate types exist through which the tribe can be derived from other members of the subfamily. Now, the Leucophoropterini at least suggest a logical progression toward development of the flattened pronotal collar from a type that primitively had no collar; however, the Hallodapini are probably not evolved from the Leucophoropterini. They appear to be most closely related to the Phylini, but no known genus suggests itself as a possible ancestral type.

Six groups can be recognized within the Hallodapini.

The Aeolocoris group. Wagner (1970b) erected the tribe Aelocorini [sic] for the genera *Aeolocoris* Reuter and *Acrorrhinium* Noualhier. He based the tribe on what he felt was a significant difference in the structure of the male genitalia between these genera and the rest of the Hallodapini, namely that the phallobase was heavily sclerotized apically and lightly sclerotized basally and that it was not firmly attached to the genital capsule. Wagner (1959) first described this condition for *Saharocylapus vidali* Wagner from Morocco. At that time he proposed a relationship between the Cylapinae and the Hallodapini based on the apparent absence of pulvilli in *Saharocylapus* and the similarity between the male genitalia of the Hallodapini and Cylapinae, viz. *Saharocylapus* and *Parafulvius* Carvalho. Later Wagner (1970b) synonymized *Saharocylapus* with *Aeolocoris*, giving scant attention to his previous placement of the former genus in the Cylapinae. If the pulvilli are actually absent in *Aeolocoris vidali* this is a derived condition, in that all other known phylines have them. Wagner's idea that the Hallodapini are related to the Cylapinae by the structure of the male genitalia is based on the incorrect subfamily placement of *Parafulvius* by Carvalho (1954) (see Phylini discussion of individual genera).

Genera belonging to the *Aeolocoris* group are: *Acrorrhinium* Noualhier, *Aeolocoris* Reuter, *Azizus* Distant, *Kapoetius* Schmitz, *Marmorodapus* Schmitz, *Syngonus* Bergroth, and *Trichophorella* Reuter (and probably *Bibundiella* Poppius). These genera constitute the most primitive element in the Hallodapini based on the broad abdomen (narrowed in *Trichophorella* and *Marmorodapus*), the absence of hemelytral fasciae (except in some species of *Acrorrhinium* and an undescribed species of *Syngonus*), the relatively non-ant-like appearance, and the absence of brachyptery (except in some species of *Acrorrhinium*). Although the group as a whole appears to have many primitive features, some included genera possess several derived characters, e.g. the spiniform frons and specialized vesica in *Acrorrhinium*.

The *Aeolocoris* group is held together by the presence of peculiar peg-like hairs on the dorsum and first antennal segment of most genera and the generally marmorate color pattern. Also, in certain genera, including *Aeolocoris*, *Azizus*, *Marmorodapus* (?), and *Trichophorella*, the eyes of the males are very much larger than those of the females. Although male Miridae generally have slightly larger eyes than the females, in *Aeolocoris* and the other genera, and also in some members of the *Hallodapus* group (see below), this dimorphism is extreme.

The *Aeolocoris* group is most diverse in tropical Africa, with all of the known genera occurring there. Only *Azizus* and *Acrorrhinium* are represented in Southeast Asia (the latter also occurring in northern Australia). The distributional pattern of the group agrees closely with that of the Hallodapini as a whole.

The Hallodapus group. The following genera form a distinct group based on uniform habitus, type of hemelytral fasciae, and other characters discussed below: *Boopidella* Reuter, *Eremachrus* Lindberg, *Hallodapus* Fieber, *Laemocoris* Reuter, *Paralaemocoris* Linnavuori, *Ribautocapsus* Wagner, and *Trichophthalmocapsus* Poppius (and probably *Omphalonotus* Reuter). All species are relatively small and ground living in those cases where the habits are known.

This group possesses the first stridulatory mechanism recorded in the Miridae, although they are well known in other families of Heteroptera (see Leston, 1957; Ashlock and Lattin, 1963). It exists in *Trichophthalmocapsus*, *Laemocoris*, and some species of *Hallodapus* (I have not examined specimens of *Ribautocapsus*, *Eremachrus*, and *Paralaemocoris* for this structure). The stridulatory device consists of a stridulitrum of fine teeth on the lateral corial margin and a plectrum of varying structure on the inner surface of the metafemur. In all species known to have the stridulatory mechanism both sexes possess it. In *Trichophthalmocapsus* and *Laemocoris* all of the species I have examined are apparently capable of stridulation. These highly derived genera probably arose from the more generalized genus *Hallodapus* in which only a limited group of species possess the structure. The stridulatory mechanism is absent in *Boopidella*, which otherwise appears most closely related to *Trichophthalmocapsus*.

Trichophthalmocapsus (and probably *Boopidella*, although no females have been available for examination) has strongly sexually dimorphic eyes. The eyes of the males are much larger than those of the females, a situation also found in certain genera of the *Aeolocoris* group.

All genera of the *Hallodapus* group occur in Africa and are usually most diverse there. *Hallodapus* is well represented in the Palearctic and Southeast Asia, but it is not known from New Guinea or Australia. This distribution agrees with the Hallodapini as a group, showing a major radiation in Africa with a more limited representation in the Palearctic and Southeast Asia. *Hallodapus albiceps* (Lethierry) from Guadaloupe Island in the Lesser Antilles (Carvalho, 1958a) is not a phyline (see page 92).

The Systellonotus group. This group includes a relatively large number of genera. Although the basic facies are quite variable, certain structures of the head, scutellum, and male genitalia suggest close relationships. Included genera are *Carinogulus* Schuh, *Cyrtopeltocoris* Reuter, *Diocoris* Kirkaldy, *Gampsodema* Odhiambo, *Glaphyrocoris* Reuter, *Hypomimus* Lindberg, *Mimocoris* Scott, *Pangania* Poppius, *Systellonotopsis* Poppius, and *Systellonotus* Fieber. *Carinogulus*, *Diocoris*, *Gampsodema*, and *Pangania* all possess projections either dorsally or laterally on the phallosome (the male genitalia of *Systellonotopsis*, *Mimocoris*, and *Hypomimus* are not known). The phallosomal projection in *Pangania* is much more highly developed than in the other three genera. The dorsal phallosomal projection also occurs in *Hallodapus similis*, the only species in the *Hallodapus* group known to possess the structure. This suggests a close relationship between the genera placed in the *Hallodapus* group and some members of the *Systellonotus* group, if in fact the dorsal phallosomal projection is homologous in all species in which it occurs. Further study of the male genitalia of the Hallodapini will be necessary to determine the phylogenetic significance of this structure. *Glaphyrocoris*, *Hypomimus*, *Carinogulus*, and *Cyrtopeltocoris* have affinities with one another based on the tuberculate scutellum and also the head, which is concave behind (except in some species of *Carinogulus*). Most of the genera in this group are ground living. *Pangania*, however, is arboreal, but may be secondarily adapted to this habit. The habits of *Diocoris* are unknown.

Pangania, *Diocoris*, and *Gampsodema* are more or less restricted to tropical Africa. The remaining genera are distributed primarily in the Mediterranean Region with a limited representation in South Africa. *Cyrtopeltocoris* is endemic to North America, and most diverse in the arid southwestern United States. The *Systellonotus* group appears to be adapted to relatively dry areas with its greatest evolution in the Mediterranean, with a possibly wider distribution across Africa in the past and an invasion of North America by the ancestor of *Cyrtopeltocoris* (see also *Coquillettia* group).

The Formicopsella group. This group contains the morphologically most ant-like genera in the Hallodapini. Included genera are *Alloeomimus* Reuter, *Aspidacanthus* Reuter, *Formicopsella* Poppius, *Malgacheocoris* Carvalho, *Myombea* China and Carvalho, *Skukuza* Schuh, and *Sohenus* Distant.

The most distinctive structural feature of the *Formicopsella* group is the head, which is dorsoventrally elongated and narrowed posteriorly, forming a neck; the eyes are far removed from the anterior margin of the pronotum. Hemelytral markings consist of a white fascia at the base of the cuneus as well as medially on the corium. The vesica is long, strap-like, and usually bent several times (Figures 160, 182) (the male genitalia are imperfectly known for *Alloeomimus*, *Malgacheocoris*, and *Aspidacanthus*). An interesting morphological specialization in *Aspidacanthus* and *Myombea* is the presence of a thin, erect spine on the scutellum. *Laemocoris* in the *Hallodapus* group shows a similar but presumably independent development.

The *Formicopsella* group is probably primarily ground living, although at least one genus, *Formicopsella*, is arboreal. The greatest diversity is in tropical Africa, but the range includes the southern Mediterranean, Madagascar, and India.

The Cremnocephalus group. Wagner (1970b) erected the tribe Cremnocephalini *sensu* Wagner to receive the genera *Cremnocephalus* Fieber, which contains two European species, and *Closterocoris* Uhler, which contains a single North American species (see discussion under misplaced genera). He substantiated the creation of this new taxon on the possession of long first tarsal segments and peculiar hemelytral markings in the included genera, and also the form of the right clasper in *Cremnocephalus*. Wagner specifically excluded *Myrmicomimus* Reuter, from southern Europe, the only other hallodapine genus with a long first tarsal segment, because it has a complete, narrow, light, transverse fascia on the anterior third of the corium and clavus, rather than the series of light lines parallel to the claval suture found in *Cremnocephalus*. Both *Cremnocephalus* and *Myrmicomimus* have a rounded pronotal collar that is unlike the flattened structure found in all other Hallodapini. Wagner (1970b) stated that *Cremnocephalus* is not ant mimetic, citing Kulenberg (1944), and that it is arboreal, whereas the Hallodapini *sensu* Wagner are ground living. He felt this supported a more distant relationship from the remaining hallodapines. However, several genera in the Hallodapini are arboreal (see *Pangania* and *Formi-*

copsella), and some are not less convincingly ant-mimetic than *Cremnocephalus* (e.g. *Orectoderus*).

The long first tarsal segment and peculiar hemelytral markings of *Cremnocephalus* occur nowhere else in the Phylinae and are of only very limited occurrence in the Miridae as a whole. This suggests that they are probably apomorphic characters. These characters set off *Cremnocephalus* as (part of) a distinct evolutionary unit, but one not significantly different from the remainder of the Hallodapini to merit tribal status. Furthermore, hemelytral markings are variable in the Hallodapini, at least much more so than the length of the first tarsal segment. Therefore, if the Cremnocephalini were to be recognized, *Myrmicomimus* would have to be included with *Cremnocephalus* because they are very closely related by the general body form, the rounded pronotal collar, type of male genitalia, and long first tarsal segment. I consider these two genera to represent nothing more than a specialized evolutionary line within the Hallodapini *sensu lato*.

The Coquillettia group. The genera *Coquillettia* Uhler, *Orectoderus* Uhler, and *Teleorhinus* Uhler (and *Cyrtopeltocoris*, discussed under *Systellonotus* group) are the only Hallodapini that occur in the New World. Reuter (1910a) placed *Coquillettia* and *Orectoderus* in the Cremnocephalini and *Teleorhinus* in his *genera incerta*. Knight (1923) and Carvalho (1952a; 1958a) placed all three genera in the Hallodapini. Knight (1941; 1968) considered these genera to be related to *Macrotylus* (and other genera with long pulvilli) and placed them in the Phylini.

Although *Colquillettia* and *Orectoderus-Teleorhinus* form two rather distinct groups they can be related on a number of derived characters. These are: 1) the presence of a long carinate gula in the males (the gula is ecarinate in the females); 2) the type of brachyptery in the females; 3) the enlarged pulvilli; and 4) the absence of minute rows of spines on the tibiae (present in almost all other Phylinae).

In the *Coquillettia* group, as in the Leucophoropterini, there is what appears to be an independent evolution of two types of gonopores in the male genitalia. This is suggested by the fact that *Coquillettia* has an obscure poorly developed gonopore situated at the apex of the vesica, whereas in *Orectoderus* the gonopore is large, well developed, and situated subapically. The type found in *Coquillettia* is possibly primitive because the flattened pronotal collar is of the form found in most other Hallodapini, whereas in *Orectoderus* and *Teleorhinus*, it is greatly modified.

Coquillettia is related to *Systellonotus* by the general body form and structure of the vesica. The carinate gula found in the males of all *Coquillettia* group genera is not present in *Systellonotus*, although it does occur in both sexes of *Mimocoris* and at least in the males of *Carinogulus*. *Systellonotus* does not have the greatly enlarged pulvilli of this group, although at least in *S. triguttatus* they are distinctly larger than in most hallodapine genera.

Coquillettia is the least specialized of the three genera in the group. *Orectoderus* and *Teleorhinus* have diverged greatly from *Coquillettia*, losing the hemelytral fascia (in most species), having the pulvilli fused to the ventral surface of the claws (free in *Coquillettia*), having the pronotal collar greatly modified, and in *Teleorhinus* having a strongly clavate second antennal segment.

Based on morphological and distributional evidence it seems reasonable to assume that the ancestor of this group was similar to *Systellonotus* in many respects and that it invaded North America from the Palearctic. The genera belonging to the *Coquillettia* group are widely distributed in North America, but show their greatest diversity in the Western mountains. Van Duzee (1921) described *Coquillettia uhleri* from Pasadena, California. This species was incorrectly recorded from "Austria; n.m. Europe" by Carvalho (1958a).

ZOOGEOGRAPHY: The distribution of the Hallodapini as portrayed by the Carvalho Catalogue is cosmopolitan, with the greatest diversity in the Palearctic and Ethiopian Regions. I have excluded the genera *Amazonocoris* Carvalho, *Closterocoris* Uhler, *Glossopeltis* Reuter, *Hallodapoides* Carvalho, *Heidemanniella* Poppius, *Nicostratus* Distant, and *Tylopeltis* Reuter, which were included in the Hallodapini by Carvalho (1958a), and moved them to other subfamilies. The tribe is thus predominantly Old World, with only two very limited groups occurring in the Nearctic, and is totally absent from the Neotropics. The Hallodapini are most diverse in Africa and the Palearctic (Figure 351a) and the faunas of these two areas are very closely related.

Hallodapines are distinctive for their extensive adaptation to relatively dry areas of the Old World. This is exemplified by the large number of genera in the Mediterranean and Africa. At present the only genera known from Southeast Asia and Australia are *Hallodapus*, *Azizus*, and *Acrorrhinium*. In these regions the Leucopteronini and Pilophorini are most abundant and probably replace the Hallodapini ecologically.

DISCUSSION OF INDIVIDUAL GENERA.

Acrorrhinium Noualhier, 1895, see page 66.

Aeolocoris Reuter, 1903, see page 121 and discussion under *Aeolocoris* group.

Alloeomimus Reuter, 1910b.

The male genitalia (as illustrated by Hoberlandt, 1953, for *Alloeomimus kurdus*), parempodia, pronotal collar, and facies confirm the placement of this genus in the Hallodapini. Two species are known from the Mediterranean.

* *Amazonocoris* Carvalho, 1952c, see genera *incertae sedis*.

* *Anapsallus* Odhiambo, 1959c, see Phylini.

Aspidacanthus Reuter, 1901.

The structure of the head and pronotum, hemelytral coloration, and general facies place this genus in the Hallodapini. The scutellar spine shows a very close relationship to *Myombea*. Two species are known from Senegal and Turkestan.

Azizus Distant, 1910a, see page 80.

Bibundiella Poppius, 1914a.

I have not examined specimens of this genus, but based on the original description, it belongs to the Hallodapini. The type specimen of *Bibundiella obscura* Poppius, is in the Helsinki Museum (personal communication, Martin Meinander, Helsinki Museum), although Poppius' (1914a) original description indicates that it was deposited in the Berlin-Humboldt Museum.

Boopidella Reuter, 1907b, see page 121.

Carinogulus Schuh, new genus, see page 81.

Chaetocapsus Poppius, 1914a.

I have not examined *Chaetocapsus binotatus* Poppius, the type species of the genus, but the original description indicates that it belongs to the Hallodapini. The holotype of *C. binotatus* is in the Helsinki Museum (personal communication, Martin Meinander, Helsinki Museum), although Poppius (1914a) indicated that it was deposited in the Berlin-Humboldt Museum.

* *Closterocoris* Uhler, 1890, Mirinae, see misplaced genera.

Coquillettia Uhler, 1890, see discussion under *Coquillettia* group.

Cremnocephalus Fieber, 1860, see discussion under *Cremnocephalus* group.

Cyrtopeltocoris Reuter, 1876a.

Reuter (1910a) placed *Cyrtopeltocoris* in the *Cremnocephalaria* and was followed by Van Duzee (1917) who placed the genus in the *Hallodapini* (*Cremnocephalaria* = *Hallodapini*); Knight (1968) later placed it in the *Pilophorini*, the position given the genus by Carvalho (1952a; 1958b). Kelton (1959b) noted that the male genitalia are of the phylinae-type. The parempodia, which are weakly fleshy and slightly convergent apically, have created confusion as to proper tribal placement. The male and female genitalia, the flattened pronotal collar, the white transverse fascia on the hemelytra, and the general body form all confirm placement in the *Hallodapini* (see also discussion under *Systellonotus* group). At least 13 species are presently placed in *Cyrtopeltocoris*, most from the Southwestern United States (see Knight, 1968).

Diocoris Kirkaldy, 1902c, see page 122.

Eremachrus Lindberg, 1958, pp. 105–106.

Described from brachypterous specimens, and placed in the *Hallodapini* by Lindberg (1958), *Eremachrus* is extremely closely related to *Hallodapus*. Only a single species is known from the Cape Verde Islands.

* *Eucerella* Poppius, 1921, see *Orthotylini*.

Formicopsella Poppius, 1914a, see page 89.

Gampsodema Odhiambo, 1959c, pp. 648–649, see *Diocoris*, page 122.

Glaphyrocoris Reuter, 1903, see page 84.

* *Glossopeltis* Reuter, 1903, *Deraeocorinae*, see misplaced genera.

* *Hallodapoides* Carvalho, 1951a, see *Orthotylini*.

Hallodapus Fieber, 1858, see page 91.

* *Heidemanniella* Poppius, 1914c, *Mirinae*, see misplaced genera.

Hypomimus Lindberg, 1940, see discussion under *Carinogulus*, page 84.

Kapoetius Schmitz, 1969, pp. 72–81.

Kapoetius belongs to the *Aeolocoris* group. One species is known from the Sudan.

Laemocoris Reuter, 1879, see page 103.

* *Lissocapsus* Bergroth, 1903, see genera *incertae sedis*.

* *Makakix* Odhiambo, 1967, Deraeocorinae, see misplaced genera.

Malgacheocoris Carvalho, 1952b.

Malgacheocoris is probably most closely related to *Formicopsella* and *Myombea* from Africa. Only a single species is known from Madagascar.

Marmorodapus Schmitz, 1970, pp. 512–520.

Marmorodapus was described with a single included species, *M. spinulatus* Schmitz. Unfortunately, by what must have been an inadvertent error, no locality data or holotype designation was included with the original description. The genus is from Africa (Congo?) and belongs to the *Aeolocoris* group.

Mimocapsus Wagner, 1953.

Mimocapsus may be closely related to *Systellonotus*. One species is known from Egypt.

Mimocoris Scott, 1872.

See discussion under *Systellonotus* group. Two species are described from southern Europe and the Mediterranean. A third species, *Mimocoris scotti* Berg, from Argentina, is almost certainly placed in the wrong genus and subfamily.

Myombea China and Carvalho, 1951, see page 104.

Myrmicomimus Reuter, 1881, see discussion under *Cremnocephalus* group.

* *Myrmicopsella* Poppius, 1914a, see Leucophoropterini.

* *Nicostratus* Distant, 1904a, Deraeocorinae, see misplaced genera.

Omphalonotus Reuter, 1876b.

Omphalonotus is probably most closely related to *Hallodapus* and allied genera. Two species are known from Europe and North Africa.

Orectoderus Uhler, 1876, see discussion under *Coquillettia* group.

Pangania Poppius, 1914a, see page 104.

Paralaemocoris Linnavuori, 1964, pp. 326–328.

This genus is most closely related to *Laemocoris* and *Hallodapus*. Three species are known from the Middle East.

Ribautocapsus Wagner, 1962, p. 83.

This genus is most closely allied to *Laemocoris* and *Hallodapus*. One species is known from Spain and Algeria.

Sohenus Distant, 1910a.

Sohenus appears to be very closely related to *Formicopsella*, from Africa, by the structure of the head, pronotum, and hemelytra, and also the color pattern. Further study may reveal that the two are synonymous. The male genitalia of *S. uvarovi* Ballard are typical of the Hallodapini, the vesica being long, with several bends, and having a well developed subapical gonopore. Two species are known from India.

Syngonus Bergroth, 1926.

Originally described under the preoccupied name *Bibundia* (Poppius 1914a), this genus was renamed by Bergroth (1926). Poppius (1914a) stated that the holotype of *Syngonus nigra* (Poppius), the only described species in the genus, was deposited in the Berlin-Humboldt Museum. In fact it is in the Helsinki Museum (Type No. 11958). *Syngonus* is probably most closely related to *Acrorhinium* and *Trichophorella*. It is peculiar in the Hallodapini in being black. An undescribed species from Ghana has a very broad white fascia medially on the hemelytra, whereas *nigra* has only a faint light marking on the corium. The former condition is not found in other members of the *Acrorrhinium* group. The head is missing from the holotype of *S. nigra*, from Cameroon.

Systellonotidea Poppius, 1914a, see *Diocoris* Kirkaldy, page 122.

Systellonotus Fieber, 1858, see page 112.

Teleorhinus Uhler, 1890, see discussion under *Coquillettia* group.

Trichophorella Reuter, 1905b, see page 114.

Trichophthalmocapsus Poppius, 1914a, see page 117.

* *Tylopeltis* Reuter, 1904, Deraeocorinae, see misplaced genera.

LEUCOPHOROPTERINI, NEW TRIBE

DIAGNOSIS: Usually ant mimetic; generally dark, often with contrasting light hemelytral maculae; head usually concave behind, eyes usually contiguous with anterior margin of pronotum; head sometimes convex behind, eyes well removed from pronotum; genae occasionally extremely hairy; pronotum usually with finely carinate

upturned anterior margin or with more or less well developed flattened collar; pronotum slightly to strongly constricted anteriorly or rarely constricted medially (hour glass shaped); scutellum always flat; hemelytra straight or weakly or strongly sinuate laterally; abdomen narrow; parempodia usually hair-like, parallel, very seldom fleshy, rod-like, and weakly convergent apically; pulvilli always minute; vesica occasionally U-shaped, weakly twisted (Figure 200), usually S-shaped, strongly twisted; male gonopore undeveloped, poorly developed, or rarely well developed; left clasper always wedge-shaped, trough-like; right clasper flat, leaf-like; posterior wall simple, posterior margin not evaginated.

NOTE: Many genera in the Leucophoropterini are undescribed and therefore cannot be given names in the following discussion.

DISCUSSION: Many genera in the Leucophoropterini are superficially very similar to members of the Hallodapini and Pilophorini. Fortunately, a distinct evolutionary sequence can be traced in the Leucophoropterini, for if this were not possible, at least some of the genera would be placed in the other two tribes. Two of the most primitive genera in this tribe (*Leucophoroptera* and *Karoocapsus*) have well developed light hemelytral maculae. The anterior margin of the pronotum in these genera is finely carinate and upturned and the head is concave behind, resembling structurally the situation found in the Pilophorini. *Tytthus*, which also appears to be relatively primitive, usually has a dark head and pronotum and light hemelytra; the head is convex behind and the anterior margin of the pronotum is similar to that of *Leucophoroptera*. Most of the derived members of the tribe have rather poorly developed hemelytral maculae and have the head and pronotum variously modified from the structure found in *Leucophoroptera* and *Karoocapsus* (see discussion below).

The male genitalia of the Leucophoropterini are distinct from those of the Hallodapini, Phylini, and Pilophorini, although the differences are often small and difficult to categorize. The gonopore is either apical and not developed (*Karoocapsus* and *Tytthus*) or subapical and poorly developed. In an undescribed genus from the Philippines, the gonopore is very well developed, but this is almost certainly a convergence toward the form found in most Hallodapini, because all other characters of this genus agree closely with the Leucophoropterini. In *Karoocapsus* and *Tytthus* the vesica is U-shaped and only very slightly twisted, resembling the form found in the Pilophorini and emphasizing the plesiomorphic character of these genera. In all other genera the vesica is distinctly twisted

and S-shaped. The male genitalia are small relative to the total body size. In contrast to the Leucophoropterini, the Hallodapini almost always have a well developed subapical gonopore (exceptions include *Coquillettia*), a strongly twisted S-shaped or more elaborately bent vesica and genitalia that are relatively large in comparison to the total size of the insect. The female genitalia of the Leucophoropterini show only very minor differences from those of the Hallodapini and Phylini, and differ from those of the Pilophorini in not having the evaginated posterior margin of the posterior wall.

Two lines of evolution toward effective ant mimicry can be recognized in the Leucophoropterini. One involves the development of a head-pronotum combination similar to that found in *Formicopsella* in the Hallodapini. In this line there is a definite transition from the type of head and anterior pronotal margin found in *Karoocapsus* and *Leucophoroptera* to an anteriorly constricted pronotum with a flat collar and head "necked" behind the eyes (genera of this type are as yet undescribed). The other line of evolution involves accentuation of the head which is concave behind, again as in *Karoocapsus*, and at the same time specialization of the pronotum to conform to the outline of the posterior margin of the head. At its highest degree of specialization the pronotum is constricted medially into an hourglass shape; this type has also evolved independently in the Pilophorini (genera in neither tribe are as yet described, however).

Two convergences, in addition to those mentioned above, occur between the Leucophoropterini and other phylinae tribes. In certain undescribed genera the gena is "carinate", forming a broad ridge below the eye. In frontal view this resembles the outline of mandibles, and its most advanced condition, includes the buccula as the apex of the mandible. A similar development occurs in at least one undescribed species of pilophorine, related to *Pilophorus*, from the Philippines. In another undescribed genus of Leucophoropterini from the Philippines the parempodia are fleshy, rod-like, and weakly convergent apically, a condition very similar to that found in some Phylini and Hallodapini.

ZOOGEOGRAPHY: Two of the most primitive genera in the Leucophoropterini, *Karoocapsus* and *Leucophoroptera*, occur in South Africa and Australia (and New Guinea) respectively. The more derived genera are found in New Guinea, New Ireland, the Solomon Islands, Borneo, and the Philippine Islands. Therefore the group probably evolved in temperate and subtropical areas of Australia (and South Africa) and subsequently spread to nearby tropical islands and became more highly specialized there. The paucity of

leucophoropterine genera in Africa (Figure 351b) suggest that either *Karoocapsus* is a relict or that the environmental conditions in tropical Africa were unsuitable for the evolution of the group. Also, competition from the Hallodapini may have been important in limiting the evolution of the Leucophoropterini in Africa. *Tytthus* appears to be in a somewhat distinct evolutionary position in the tribe. It is nonmimetic, has the head convex behind, and is cosmopolitan.

DISCUSSION OF INDIVIDUAL GENERA.

Biliranina Carvalho, 1956a, pp. 215–216.

Biliranina myrmecoides Carvalho, from the Philippines, was placed in the Pilophorini and related to *Leucophoroptera* by its author. Carvalho (1956a) did not illustrate the male genitalia, but the facies of *Biliranina* indicate that it probably belongs to the Leucophoropterini. The complex distribution of the Leucophoropterini and the Pilophorini in Southeast Asia and the great external similarity of the two groups makes it necessary to only tentatively assign *Biliranina* to the Leucophoropterini, until specimens can be examined and the male genitalia dissected.

Karoocapsus Schuh, see page 123.

Leucophoroptera Poppius, 1921.

Leucophoroptera was originally described from New South Wales, Australia, and New Guinea. I have examined an undescribed species from Queensland, Australia, in which the male genitalia are similar to those of *Karoocapsus*, but the vesica is more strongly S-shaped. The female genitalia of *L. quadrimaculatus* have a posterior wall consisting of a simple sclerotized plate.

Poppius (1921) described *L. quadrimaculatus*, the type species of the genus, from specimens from New South Wales, Australia, and New Guinea ("Ins. Deslacs"). I have examined a female from the Helsinki Museum from the latter locality. The other specimens are apparently in the Hungarian Museum and they must be studied before a lectotype can be designated.

Myrmicopsella Poppius, 1914a.

The holotype female of *Myrmicopsella nitidipenne* Poppius from Tananarive, Madagascar, is the only known representative of the genus. It almost certainly belongs to the Leucophoropterini, and is probably most closely related to *Karoocapsus*. Poppius (1914a) noted that this specimen was deposited in the Paris Museum, but in fact, it is in the Helsinki Museum (Type No. 7788).

Tytthus Fieber, 1864, see page 135.

TRIBE PHYLINI

DIAGNOSIS: Facies, coloration, and vestiture variable, never ant mimetic; females occasionally brachypterous; flattened pronotal collar absent (except in *Eminoculus*); dorsum very seldom heavily punctate; parempodia usually hair-like, parallel, occasionally fleshy, rod-like, of nearly uniform diameter, weakly convergent apically; pulvilli minute or enlarged, free or fused to ventral surface of claws; vesica always twisted (only very slightly in *Pseudosthenarus* and *Parapseudosthenarus*), gonopore usually subapical, well developed; left clasper always wedge shaped, trough-like (somewhat modified in *Pseudosthenarus*); posterior wall never with evaginate posterior margin.

DISCUSSION: The Phylini have traditionally been the tribe in the Phylinae which contained all nonmimetic and/or collarless genera. Until a thorough analysis of this large cosmopolitan group can be undertaken, I am defining the tribe as consisting of all nonmimetic, collarless genera without convergent recurved parempodia.

Tribes recognized by certain authors that I include in the Phylini are Cremnorrhini, Harpocerini, Camptotylini, Exaeretini, Tuponiini, and Semiini. A few additional tribes have been recognized, but these are of mostly historical interest.

The Oncotylini have been recognized by Reuter (1883; etc.), Van Duzee (1916), Knight (1923), and other authors to include genera with enlarged pulvilli (e.g. *Lopus* Hahn and *Macrotylus* Fieber). Although many genera with this tarsal condition are probably closely related, they do not appear to merit tribal status, when considered relative to the total variation of the pulvilli in the Phylini. Also, the condition has evolved independently in the Hallodapini (see *Coquillettia* group).

The Cremnorrhini have recently been recognized (Wagner and Weber, 1964) to include the single Eastern Mediterranean genus *Cremnorrhinus* with the single included species *C. basalis* Reuter; the Harpocerini (Wagner, 1952) to include *Harpocera* Curtis, from Western Europe and the Mediterranean; the Camptotylini and Exaeretini (Wagner, 1952; Wagner and Weber, 1964) to include the Mediterranean genera *Camptotylus* Fieber and *Exaeretus* Fieber, respectively; and the Tuponiini (Wagner, 1952, as a subtribe; Wagner and Weber, 1964, as a tribe) to include *Tuponia* Reuter and closely related genera. None of the above tribes is based on a com-

parative analysis of the world fauna, and for the most part they are founded on structures that vary throughout the Phylini *sensu lato*. The genitalia in *Camptotylus* (see Wagner and Weber, 1964) (and probably *Exaeretus*), are somewhat peculiar in the Phylinae, but in the form of the right clasper, a parallel to *Camptotylus* is found in *Pseudosthenarus* from South Africa, although the two are probably unrelated, based on the structure of the vesica. The Harpocerini and Cremnorrhini are defined on color characters (Wagner, 1952). The Tuponiini are separated from the Exaeretini (= Camptotylini) (Wagner and Weber, 1964) on the length and shape of the labium, a character I have found to be extremely variable (e.g., compare *Pseudosthenarus*, *Capecapsus*, and *Coatonocapsus* with one another and with other phylines). The tribe Semiini (Knight, 1923) was erected within the Orthotylini, but the only included genus, *Semium* Reuter, has since been transferred to the Phylini (Kelton, 1959a).

Several genera, in addition to those discussed above, are somewhat anomalous within the Phylini. *Reuteroscopus* Kirkaldy, from North and Central America, has a vesica quite distinct from all other known Phylinae (see Kelton, 1964). The coleopteroid females and stylate eyes of *Eminoculus*, from South Africa, are unique in the Phylinae, and resemble those of *Pachytomella* Reuter in the Halticini. Also *Eminoculus* is the only known Phylini genus with a flattened pronotal collar. This character might relate the genus to the Hallodapini, but otherwise *Eminoculus* bears no obvious relationship to that tribe, and the collar is probably independently evolved relative to the Hallodapini. The male genitalia of *Pseudosthenarus* and *Parapseudosthenarus* from South Africa, show no close relationship to any other known genera, although externally *Pseudosthenarus* closely resembles some species of *Sthenarus*.

Until the Phylini as a whole can be carefully studied, I do not consider it advisable to subdivide the tribe. Although the other tribes recognized within the subfamily may in some cases represent derivatives of the Phylini (especially the Hallodapini), it seems desirable to recognize individual phyletic lines of specialization, e.g. ant mimicry, within the Phylinae, rather than conceal them within an omnibus tribe. Subdivision of the Phylini along phyletic lines at the present time would, however, be nearly impossible.

I have not examined the following genera placed in the Phylini by Carvalho (1958a) and have not found references which will allow confirmation of subfamily or tribal placement: *Alloeotarsus* Reuter, *Boopidocoris* Reuter, *Capellanus* Distant, *Cephalocapsidea* Poppius, *Decomia* Poppius, *Demoplesia* Poppius, *Ectagela* Schmidt, *Ectenellus*

Reuter, *Ephippiocoris* Poppius, *Eucharicoris* Reuter, *Euderon* Puton, *Exaeretus* Fieber, *Hadrophyes* Puton, *Homolaner* Kiritschenko, *Ibiaris* Horvath and Reuter, *Leucodellus* Reuter, *Litoxenus* Reuter, *Myochroocoris* Reuter, *Nicholia* Knight, *Nyctidea* Reuter, *Oligobiella* Reuter, *Opisthotaenia* Reuter, *Pararagmus* Poppius, *Phoenicocapsus* Reuter, *Pleuroxonotus* Reuter, *Pronotocrepis* Knight, *Sceodamia* Poppius, *Sthenaropsis* Poppius, *Taeniophorus* Linnavuori, *Trevessa* China, and *Utopnia* Reuter.

ZOOGEOGRAPHY: The Phylini are the only tribe in the Phylinae that occur in the Neotropical Region (with the exception of one species of Pilophorini). Some records for South America are old and pertain to species placed in large, widely distributed genera, which may in fact be incorrectly assigned. The actual amount of endemism in the Neotropics cannot therefore be accurately determined.

Data for the Nearctic indicate that the fauna consists of two basic elements: 1) an endemic fauna; and 2) a fauna closely related to the Palearctic at the generic level (Figure 351c). The Palearctic phylina fauna is extremely large, but probably not as diverse as the data would indicate. As discussed above, Wagner (1952) and Wagner and Weber (1964) have divided the Palearctic Phylini into five tribes, but the majority of the genera are placed in one tribe, the Phylini. The one element of the Palearctic fauna that has received attention recently, particularly from Wagner (1957b; 1959; 1961; etc.) and Linnavuori (1961; 1964; etc.) is the Mediterranean. This region is very interesting and seems to hold most of the anomalous types in the Palearctic fauna as a whole.

With regard to the Ethiopian Region, my investigations on the Phylini of South Africa reveal some interesting facts. Several generic groups, based on the structure of the male genitalia, appear to exist within the Ethiopian fauna, even though the relationship of the genera is not obvious from general facies. For example, heavy punctations on the dorsum are extremely uncommon in the Phylini. *Lamprosthenarus*, which is heavily punctate, has a vesica very similar to that of *Coatonocapsus*, *Austropsallus*, *Odhiamboella*, and others, which are impunctate.

The genera of Phylini presently recorded from the Oriental region are mostly of wide distribution, occurring in several faunal regions (Fig. 351c). At present no endemic Phylini are known from Australia.

The Phylini are adapted primarily to temperate regions and probably to floras of those areas. This is suggested by the abundance of genera in the Palearctic and Nearctic and the paucity of genera in

tropical areas, a phenomenon that may be to some extent the result of inadequate collecting in the tropics. However, I have examined large collections of Miridae from Africa, and have found very few Phylini from areas other than the Mediterranean and South Africa. Examination of the known distributions of the Bryocorinae and Deracorinae, which are no more or less well known than the Phylini, reveals that they are primarily tropical, with only a very few representatives in temperate regions. This confirms that although absolute faunal compositions are not known, the relative diversity of mirid taxa in temperate and tropical areas is well enough known to make useful comparisons.

DISCUSSION OF INDIVIDUAL GENERA.

Anapsallus Odhiambo, 1959c, pp. 680–681.

Odhiambo (1959c) placed *Anapsallus* in the Hallodapini because of its wide pronotal collar. My examination of the holotype of *A. marmoratus* Odhiambo reveals that in fact there is no pronotal collar and that the genus belongs in the Phylini.

Ellenia Reuter, 1910a, see page 157.

Erythrocorista Lindberg, 1958, see Orthotylini.

Millerimiris Carvalho, 1951b.

Carvalho (1951b) placed *Millerimiris* in the Orthotylini, but his illustrations of the male genitalia indicate that it is actually a member of the Phylini. My examination of the holotype of *M. punctatus* Carvalho reveals that the parempodia are only weakly fleshy and similar to the type found in *Ellenia* and *Capecapsus*.

Parafulvius Carvalho, 1954.

This genus was placed in the Fulviini (Cylapinae) by Carvalho (1954), on the basis of the type of claws and male genitalia. Carvalho (1954) stated that *Parafulvius* resembles *Amblytylus* Fieber. In fact it is probably closely related to that genus. The genitalia as illustrated by Carvalho are definitely phylinae, and the claws, although they may be long and slender, fit into the range of variation found in the Phylinae.

Paramixia Reuter, 1900, Pilophorini, see page 210.

Platyscytus Reuter, 1907a.

This genus has been assigned to the Orthotylini by Carvalho (1952a; 1958b). Examination of illustrations of the male genitalia of species of *Platyscytus* described by Carvalho (1953b) and Car-

valho and Fonseca (1965) and examination of specimens of the genus, indicate that it belongs to the Phylini. Also, the parempodia are hair-like and not of the type found in the Orthotylini.

Psallops Usinger, 1946, Cylapinae ?, see pages 263–264.

Semium Reuter, 1876a.

Placed in the Orthotylini by Carvalho (1958b), this genus was correctly moved to the Phylini by Kelton (1959a).

TRIBE PILOPHORINI

DIAGNOSIS: Elongate or robust, sometimes ant mimetic; seldom if ever strongly brachypterous or sexually dimorphic; head declivous to nearly vertical, concave behind, posterior margin of vertex usually carinate; pronotum usually broad and nearly flat, although sometimes highly modified with tubercles or strongly constricted medially; hemelytra usually without defined fasciae contrasting with background coloration; often with light transverse band on hemelytra formed by aggregations of sericeous scale-like hairs; parempodia fleshy, recurved, convergent apically; pulvilli minute; vesica simply curved, U-shaped, not twisted, without enlarged apical or subapical gonopore (Figure 318); phallosome usually nearly straight, without right-angle bend (L-shaped); opening usually terminal (Figure 325); left clasper sometimes distinctly trough-like (*Paramixia*, Figure 334), usually splayed out, wing-like (Figure 320); right clasper small and leaf-like, typical of subfamily; female genitalia with sclerotized rings usually with moderate lateral infolding (Figure 317); posterior wall simple, lacking K-structures (Figure 315), but with evagination dorsally along posterior margin (Figure 316).

DISCUSSION: Most authors have defined the Pilophorini as those ant-mimetic mirids with convergent parempodia. Wagner (1952; 1955) was the first author to realize that the tribe, as so defined, was composed of unrelated genera and he redefined the group as those mirids with convergent recurved parempodia and Phylinae-type male genitalia.

In analyzing the Orthotylineae and Phylinae I have concluded that the convergent recurved parempodia are ancestral and that the hair-like parempodia found in the Phylinae are derived from them. I have reached this conclusion because, when convergent recurved parempodia are regarded as derived, as can be inferred from most classifications, it becomes necessary to evolve the phylinae-type male genitalia twice. I am following Knight (1941) who regarded the complex structure of the phylinae male genitalia as a fundamental

character in classification; I consider them to be derived and therefore (as previously discussed) place the Pilophorini in the Phylinae, rather than the Orthotylinae as all previous authors have done. I interpret the convergent recurved parempodia as primitive; thus the phyline-type male genitalia need to be evolved only once.

As members of the most primitive phyline tribe, *Pilophorus* and closely related genera (e.g. *Aloea*) have the simplest male genitalia in the subfamily. The vesica is a U-shaped, untwisted tube with a gonopore that is little more than a subapical opening in the wall of the vesica. The most complex pilophorine vesica is that of *Parasthenaridea* Miller. Although U-shaped and untwisted, the vesica is no longer a simple tube, but consists of what resemble two partially concentric sclerotized bands. Peculiar projections on the inner surface of the vesica are a unique feature of many pilophorine genera (e.g. *Pilophorus*, *Parasthenaridea*). The pilophorine phallosome is also plesiomorphic in the Phylinae. It is not bent at a right angle (except in *Paramixia*) as in all other Phylinae, and is structurally closest to the orthotyline-type. As discussed above, the pilophorine posterior wall is advanced in the Phylinae and must have evolved subsequent to the split of the Phylinae into the Pilophorini and non-Pilophorini lines of evolution.

The Pilophorini apparently do not possess brachypterous forms, although they are common in all other phyline tribes. The greatest degree of wing modification or reduction in this tribe is what might best be called submacroptery, as found in females of *Aloea*. Even in the ant-mimetic genus *Pilophorus*, brachypterous females are unknown. Wing polymorphism is an adaptation to a specialized or stable environment (see Sweet, 1964) and therefore must be derived. The apparent absence of brachyptery in the Pilophorini is a further suggestion of their primitiveness in the Phylinae.

ZOOGEOGRAPHY: My redefinition of the Pilophorini on a world basis changes the zoogeographic picture from one of more or less equal distribution in all zoogeographic regions in the Carvalho classification to one of greatest diversity in the Old World tropics and virtual absence from the neotropics (Figure 351d).

Two relatively distinct groups of genera can be recognized in analyzing the distribution of the Pilophorini. The *Ambonea* group is not ant mimetic. It is restricted primarily to Africa, constituting almost the entire fauna there; the only nonmember of the *Ambonea* group found in Africa is a single species of *Pilophorus*. The *Pilophorus* group, which is distinctly ant mimetic, is most diverse in Southeast Asia, with limited representation in the Nearctic and Pale-

arctic. In North America *Pilophorus* has radiated extensively, but no studies have been undertaken to determine if the 50 or so described species from that region are all closely related or if they represent separate elements in the genus and therefore independent invasions of the continent. The limited generic representation of the tribe in North America indicates invasion of the area from Southeast Asia, possibly via the Bering Land Bridge, rather than migration from North America to Southeast Asia.

Paramixia, a morphologically somewhat anomalous genus in the *Pilophorini*, is pantropical, *P. carmelitana* (Carvalho) being the solitary neotropical pilophorine. *Parasthenaridea* Miller, a pilophorine with specialized male genitalia, but resembling the *Ambonea* group, is known only from Malaya.

DISCUSSION OF INDIVIDUAL GENERA

The incorrect subfamily placement and ant-mimic definition of the *Pilophorini* by Carvalho (1952a; 1958b) obscured the true relationships of the group as a whole and also of many included genera.

Alepidea Reuter, 1909.

Alepidea is very closely related to *Pilophorus* by the structure of the male genitalia (Kelton, 1959b) and by the structure of the female genitalia, in which the posterior margin of the posterior wall is evaginated.

Two species are known, both from the Eastern United States.

Alepidiella Poppius, 1914b.

This genus contains only a single species from the Eastern United States. It is very closely related to *Alepidea*.

Aloea Linnavuori (in press), see page 196.

Ambonea Odhiambo, 1960b, see page 201.

* *Anthrophagiotes* Kirkaldy, 1908, see genera *incertae sedis*.

* *Borgmeiorea* Carvalho, 1956c, see *Orthotylini*.

* *Cyphopelta* Van Duzee, 1910, *Mirinae*, see misplaced genera.

* *Cyrtopeltocoris* Reuter, 1876a, see *Hallodapini*.

* *Dolichostenia* Poppius, 1921, see genera *incertae sedis*.

* *Eucerella* Poppius, 1921, see *Orthotylini*.

* *Eucompsella* Poppius, 1914a, see *Nichomachini*.

* *Hallodapoides* Carvalho, 1951a, see Orthotylini.

Hyseloecus Reuter, 1891.

The placement of *Hyseloecus* in the Pilophorini (Wagner, 1952) is verified by the structure of the parempodia and male genitalia.

A single species is known from the Palearctic.

* *Kirkaldyella* Poppius, 1921, see Orthotylini.

* *Laemocoridae* Poppius, 1921, see Orthotylini.

* *Lasiomimus* Poppius, 1914a, see genera *incertae sedis*.

* *Lepidotaenia* Poppius, 1921, see Orthotylini.

* *Leucophoroptera* Poppius, 1921, see Leucophoropterini.

* *Lutheriella* Poppius, 1913, see genera *incertae sedis*.

* *Myrmecophyes* Fieber, 1870, see Halticini.

* *Myrmecoridae* Poppius, 1921, see genera *incertae sedis*.

* *Myrmecozelotes* Berg, 1883, see genera *incertae sedis*.

Neoambonea Schuh, new genus, see page 204.

* *Nichomachus* Distant, 1904a, see Nichomachini.

* *Opistocyclus* Poppius, 1914a, Deraeocorinae, see misplaced genera.

Parambonea Schuh, see page 207.

Paramixia Reuter, 1900, see page 210.

Parasthenaridea Miller, 1937.

See Pilophorini tribal discussion. The female genitalia will help to confirm tribal placement of *Parasthenaridea*. Only a single species is known from Malaya.

* *Pilophoropsis* Poppius, 1914c, see Orthotylini.

Pilophorus Hahn, 1826.

Reuter (1910a) placed *Pilophorus* in the division Heterotomaria in the subfamily Heterotomina; Carvalho (1952a) placed the genus in the Pilophorini, as have most other modern authors. Slater (1950) noted the marked differences in the female genitalia between *Pilophorus* and *Pseudoxenetes*, the two genera he studied in the Pilophorini, particularly the lack of K-structures in *Pilophorus* and their presence in *Pseudoxenetes*. Kelton (1959b) correctly noted that

the male genitalia of *Pilophorus* appeared much more closely allied to the Phylinae than to the Orthotylineae. *Pilophorus* may be composite as presently constituted, but the basic body plan is the same in all species, and the male genitalia are very similar from species to species for those representatives that have been examined. The female genitalia have the distinct evagination along the posterior margin of the posterior wall.

Pilophorus is well represented in the Palearctic, Nearctic, and Oriental regions. Only one species is known from sub-Saharan Africa and none are as yet recorded from the neotropics or from Australia.

* *Pseudoxenetes* Reuter, 1909, see Orthotylini.

* *Renodaeus* Distant, 1893, see Orthotylini.

* *Sericophanes* Reuter, 1876a, see Orthotylini.

* *Tuxenella* Carvalho, 1952d, see Orthotylini.

* *Zanchisme* Kirkaldy, 1904, see genera *incertae sedis*.

Zaratus Distant, 1909b.

Zaratus is known only from the holotype female of *Z. repandus* Distant, from India. The genus was placed in the Pilophoraria by Distant (1910b), *genera incerta* by Reuter (1910a), and the Pilophorini by Carvalho (1952a). My examination of the holotype indicates that the genus is very closely related to *Pilophorus*, although I have not examined the genitalia. This conclusion is supported by its occurrence in Southeast Asia.

MISPLACED GENERA¹

Bunsua Carvalho, 1951b.

This African genus was placed in the Orthotylini by Carvalho (1952a). Examination of a paratype of *Bunsua bryocoroides* Carvalho reveals that the genus has the pulvilli attached to the interior surface of the claws and that the posterior wall lacks K-structures. *Bunsua* must therefore be removed from the Orthotylineae and placed in the Bryocorinae, at least tentatively.

Careful examination of the type material of the genus *Petasma* Odhiambo, 1960 (pp. 343–348), reveals that it is synonymous with *Bunsua* Carvalho (**New Synonymy**).

¹The genera listed were placed in the Orthotylineae or Phylinae by Carvalho (1952a; 1958a,b) or subsequent authors but actually belong in other subfamilies.

Closterocoris Uhler, 1890.

The tribal position of *Closterocoris* has been in dispute for some time. Carvalho (1952a) placed the genus in the Hallodapini, although Knight (1922) had shown rather conclusively that it belongs to the Mirinae. Kelton (1959b) confirmed the placement in the Mirinae on the basis of the male genitalia. Wagner (1970b) placed *Closterocoris* in his Cremnocephalini (Phylinae), even though he had access to Kelton's work on the male genitalia and routinely used the vesica in the Phylinae as a diagnostic feature of the subfamily.

Cyphopelta Van Duzee, 1910.

Kelton (1959b) confirmed the placement of *Cyphopelta* in the Mirinae on the basis of the male genitalia, although previous workers showed great disagreement on the proper subfamily position. Carvalho (1952a) placed *Cyphopelta* in the Pilophorini.

Glossopeltis Reuter, 1903.

This African genus was placed in the Hallodapini by Carvalho (1952a). The strongly toothed claws, hair-like parempodia, punctate dorsum, rounded pronotal collar, male genitalia, and claws without pulvilli all confirm a position in the Deraeocorinae, Surinamellini (Carvalho and Fonseca, 1962), however.

Specimens of *G. coutierei* Reuter, the type species of the genus, are present in both the Helsinki and Paris Museums. The single female specimen in Paris bears no locality labels, but has a determination label reading "*Glossopeltis coutierei* Reuter n.g. et n. sp., spec. typ.". Single male and female specimens from Helsinki bear "Obock" labels; the female also bears a determination label of Poppius. Reuter (1903) did not indicate that specimens from the type series which he examined were placed in Helsinki, but Poppius (1914a) cited the same locality data as Reuter (1903) and noted that specimens did exist in Helsinki. The locality data of the two specimens in Helsinki do not agree exactly with that given in Reuter's original description (they read "Museum Paris, OBOCK, Maindron 871-93"), but the specimens are probably those examined by him. I have therefore labeled the female specimen in the Paris Museum as the lectotype—"LECTOTYPE *Glossopeltis coutierei* Reuter, det R. T. Schuh."

Heidemanniella Poppius, 1914c.

The North American genus has long been placed in the Hallodapini (Carvalho, 1952a). My examination of the holotype of *H.*

scutellaris Poppius, reveals that *Heidemanniella* is probably most closely related to *Cyphopelta* and *Closterocoris* in the Mirinae. The only specimen is the holotype female and at the time of my examination it was glued to a card so that the parempodia were not visible. Additional specimens and further study will almost certainly confirm placement of *Heidemanniella* in the Mirinae rather than the Phylinae.

Makakix Odhiambo, 1967, pp. 1673–1676.

This African genus is very closely related to *Opistocyclus* Poppius. Odhiambo (1967) placed *Makakix* in the Hallodapini, with reservation. He gave excellent illustrations of the tarsal claws, which are strongly toothed at the base, but did not mention a possible relationship to the Deraeocorinae. The male genitalia of *Makakix* are not available. Examination of related genera, including *Nicostratus* Distant, reveals that the form of the tarsal claws is a valid subfamily character for recognizing mimetic as well as nonmimetic Deraeocorinae. *Makakix* belongs to the Deraeocorinae, Surinamellini.

Nicostratus Distant, 1904c.

Carvalho (1952a) assigned this peculiar Southeast Asian genus to the Hallodapini. The strongly toothed tarsal claws and the male genitalia, however, unequivocally place it in the Deraeocorinae, Surinamellini.

Opistocyclus Poppius, 1914a.

This African genus is most closely related to *Makakix* and *Glossopeltis*, as confirmed by the strongly toothed tarsal claws, conical scutellum, and punctate dorsum. Therefore it must be placed in the Deraeocorinae, Surinamellini.

Poppius (1914a) stated that the type of *O. myrmecoides* Poppius, the only species in the genus, was deposited in the Berlin-Humboldt Museum; however, it is in the Helsinki Museum (Type No. 7775).

Tylopeltis Reuter, 1904.

My examination of the holotype of *Tylopeltis albosignata* Reuter, the only species in the genus, in the Brussels Museum, indicates that *Tylopeltis* does not belong to the Hallodapini (Carvalho, 1952a), but to the Deraeocorinae, Surinamellini. This position is supported by the structure of the male genitalia, the conical scutellum, the punctate dorsum, and the rounded pronotal collar.

Genera *incertae sedis*¹*Amazonocoris* Carvalho, 1952c.

Amazonocoris longipilosus Carvalho was placed in the Hallopapini by Carvalho (1952a). On the basis of the male genitalia as illustrated by Carvalho (1952c), this Brazilian genus appears to be much more closely related to the Dicyphinae than to the Phylinae. Carvalho does not mention the structure of the parempodia in the original description, but says only that the pulvilli are minute, which would suggest that *Amazonocoris* does not belong to the Dicyphinae. I have not been able to find the holotype of *A. longipilosus* in the British Museum (Natural History) and therefore cannot determine the correct subfamilial placement.

Anthropophagiotes Kirkaldy, 1908.

The whereabouts of the holotype of the only species included in this Fijian genus is unknown, and the original description is inadequate for placing the genus in the correct subfamily. Carvalho (1952a) placed *Anthropophagiotes* in the Pilophorini.

Dolichostenia Poppius, 1921.

I have not seen specimens of this genus erected by Poppius (1921) for a species from Chile, and therefore its subfamily placement must remain uncertain. Carvalho (1952a) placed *Dolichostenia* in the Pilophorini. This is almost certainly incorrect, and it will probably prove to be a member of the Orthotylini.

Idiomiris China, 1963, pp. 709–711.

China described this peculiar genus from Chile, and on the basis of the pretarsal structures and male genitalia placed it in the Orthotylini. This is certainly incorrect. *Idiomiris* is much more closely related to either the Mirinae or the Deraeocorinae than to the Orthotylinae. I was not able to find the male genitalia in the British Museum (Natural History). All of the characters enumerated by China, however, indicate the closest relationship with the Deraeocorinae, as does the basic facies, even though the claws are not toothed basally, as is usually the case in that subfamily.

Lasiomimus Poppius, 1914a.

I have not examined specimens of this African genus, although they are probably present in the Leningrad Museum. Carvalho (1952a) placed *Lasiomimus* in the Pilophorini.

¹The genera listed were placed in the Orthotylinae and Phylinae by Carvalho (1952a; 1958a,b) or by subsequent authors, but are unknown to me or are otherwise of uncertain systematic position.

Lissocapsus Bergroth, 1903.

Bergroth (1903) commented that the type specimen of *L. wasmanni* Bergroth was received from E. Wasmann of Luxembourg, but he did not say where it was deposited. Until specimens of this species can be located and carefully examined, the subfamily placement must remain in question. Carvalho (1952a) placed this Madagascan genus in the Halodapini.

Lutheriella Poppius, 1913.

I have not seen specimens of this genus from Ceylon, and therefore cannot confirm its placement in the Pilophorini (Carvalho, 1952a).

Myrmecoridea Poppius, 1921.

The type specimens of this Australian genus are probably deposited in the Hungarian Museum (Poppius, 1921) and will have to be examined before its subfamily placement in the Pilophorini (Carvalho, 1952a) can be confirmed.

Myrmecoroides Gross, 1963, pp. 7-10.

This very peculiar genus from Australia has apically convergent recurved parempodia, but the bizarre structure of the head and the strong ant-mimetic facies require that the male and female genitalia be examined before subfamily placement can be confirmed.

Myrmecozelotes Berg, 1883.

This Argentinian genus was placed in the Pilophorini by Carvalho (1952a). I have not examined specimens and have not found adequate information in the literature to determine its correct subfamily placement.

Zanchisme Kirkaldy, 1904.

This Neotropical genus probably belongs to the Orthotylini. Carvalho (1952a) placed it in the Pilophorini. I have not examined specimens or found adequate information in the literature to confirm the subfamily placement of *Zanchisme*.

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